SOCIETY OF AMERICAN FORESTERS 1900

Journal of FORESTRY

July 1959
Volume 57
Number 7

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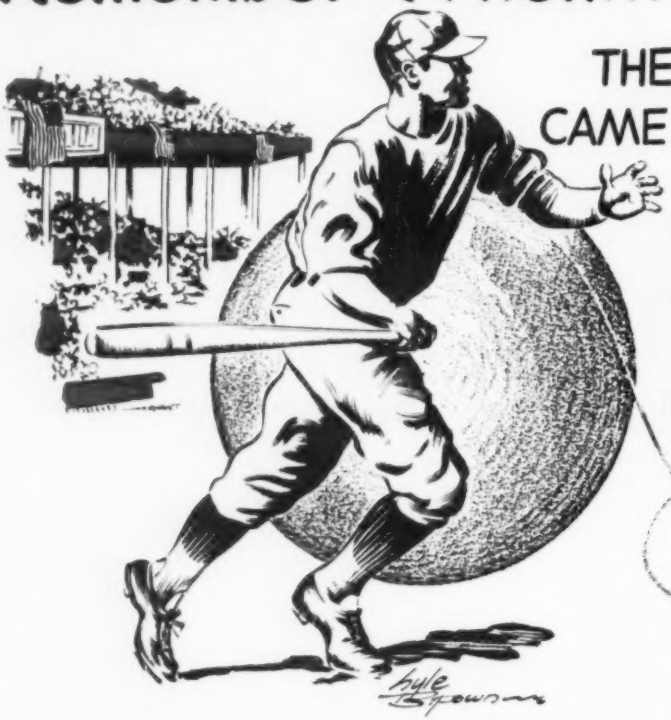

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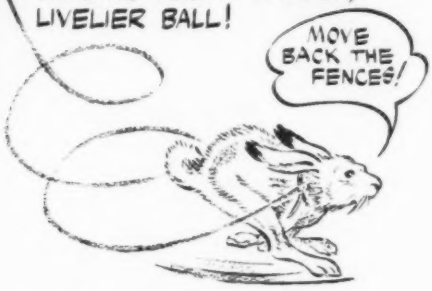

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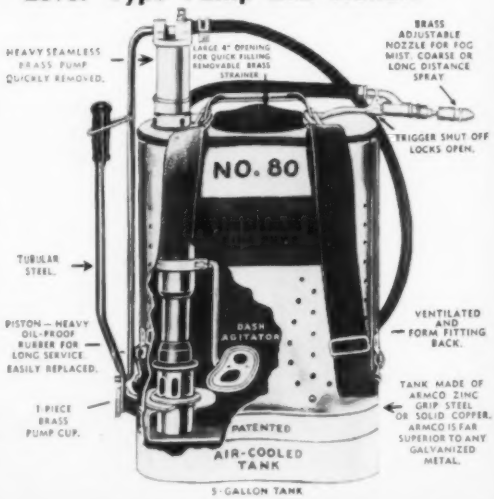
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VOLUME 57
NUMBER 7

Journal of Forestry

JULY 1959

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The JOURNAL OF FORESTRY, established in 1917, is the official organ of the Society of American Foresters, but the Society assumes no responsibility for the statements and opinions expressed by contributors.

Publication office, 425 Mills Building, 17th Street at Pennsylvania Avenue N. W., Washington 6, D. C. Address all correspondence concerning editorial or business matters to JOURNAL OF FORESTRY, 425 Mills Building, 17th Street at Pennsylvania Avenue N. W., Washington 6, D. C. Published monthly. Subscription $7.50 per year; single copies 75 cents. Missing numbers will be replaced without charge provided claim is made within thirty days after date of the following issue.

The editors are not responsible for loss or damage of manuscripts and photographs while in transit or in their possession. All material submitted for publication should be accompanied by return postage.

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Courtesy U. S. Forest Service by A. G. Varda.

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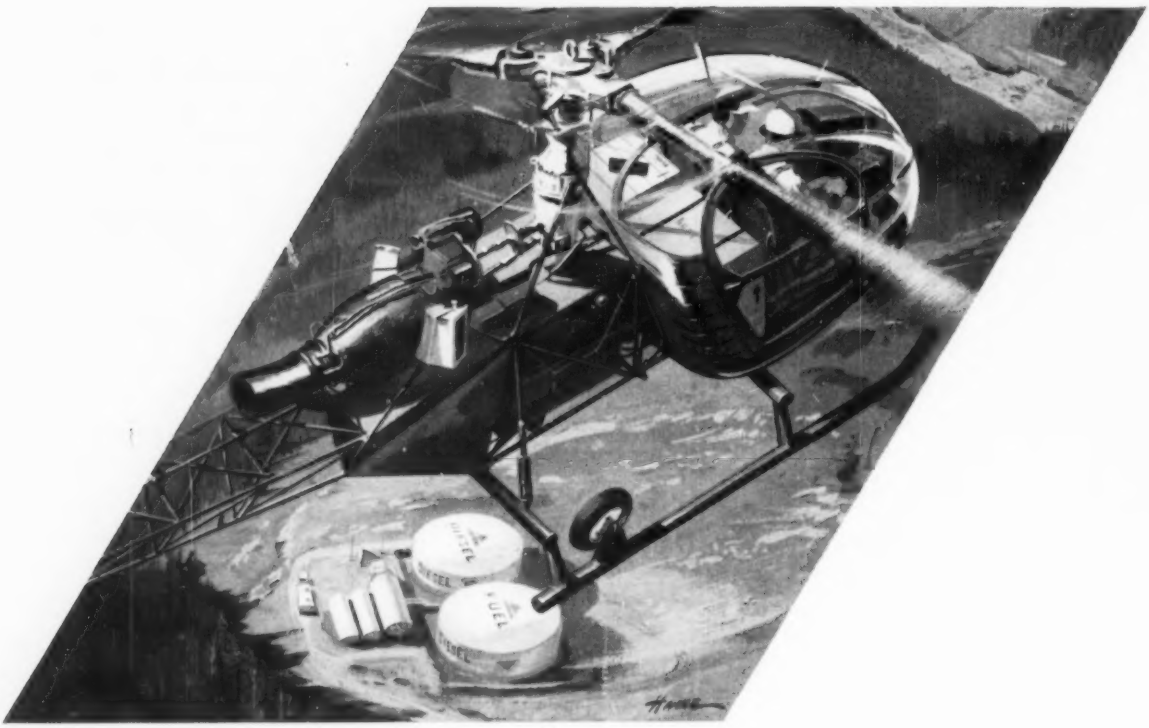

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Journal of Forestry

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Council's Column

Education for a Profession

Selection of the topic for discussion in this issue of the Council's Column has been prompted by the attention which has been devoted to the indicated subject in more than a few of the Section meetings I have been privileged to attend during the past year and a half. In panel discussions and other presentations attention has been directed, often in a spirit of self-appraisal, to the educational shortcomings of foresters as evidenced in the practice of their profession. In fact, in evaluating most aspects of our profession, we seem invariably to take the educational base as our reference point.

There seems to be rather general agreement that our schools are doing a creditable job in the technical preparation of their graduates for the forestry work at hand. By and large these men are also conceded to receive better than passing grades in devotion to the job, energy, and enthusiasm and, within their particular technical areas, to rate well in imagination and ingenuity in finding solutions to their day by day problems.

But persistent emphasis is given to the forester's need for improving his ability to communicate—to transmit his ideas to his business and professional associates and to the general public, through effective writing and speaking. In fact, whether it be in preparing and submitting reports to his superiors to account for his activities or stimulate action programs, or in engendering good will for his company or agency among laymen and public organizations with which he comes in contact, ability to "sell" his ideas may well be one of the forester's most effective attributes. It will have a large bearing on his ability to motivate and work with the people in his own organization; it will have an equally important bearing on his ability to perform an adequate public relations job in dealing with a wide range of actual and potential critics or supporters of the policies and practices of the organization he represents and in improving public understanding of forestry and recognition of its professional opportunities and responsibilities.

In matters pertaining to public relations, it has been pointed out that the forester's management crises often come in the field of the humanities, where knowledge gained from early training and education would be of invaluable assistance in resolving the difficulties involved. Better than average command of English, knowledge of human behavior, and appreciation of the arts will all combine to improve the forester's standing in the eyes of the general public. The opportunities for the forester of the future to lose himself in the woods or in the laboratory will become fewer. Most foresters will be judged by the public for whom they work, or with whom they come in contact, more on their possession of abilities and skills that are, or should be, common to all people of broad educational background, than on demonstrations of professional efficiency.

In the light of present-day employment opportunities in forestry, it is interesting to consider the qualities and attributes employers are seeking in the men they hire. In appraising the work of industrial and public foresters a major distinction has been pointed up as a consequence of the adjustments these two groups are required to make to the rather contrasting primary objectives of the employing agencies, with the man in private work confronted with the "need to be commercial" in developing and executing his management plans, while his opposite number in public employ is expected to give appropriate recognition to the various and often conflicting multiple-use pressures imposed on him by the different "publics" he serves. This is not to imply, of course, that the industrial or other private forester is insensitive to the multiple-use aspects of his job or the possible social implications of his administrative acts; on occasion these may be of paramount importance in planning certain projects. Nor is the public forester necessarily unconcerned with some of the economic aspects of his management activities. But in the matter of degree and extent of concern with these factors, a marked distinction may be drawn between the two groups—a situation which has definite implications in the training provided in our forestry schools.

In either field, public forestry or industrial, the employer may take it for granted that the graduate will possess the skills which qualify him in his calling, since the imparting of such technical competence is the primary function of the professional curriculum. He may also expect that the training the young graduate has had is based on a firm foundation of relevant science, engineering, and economics. Beyond that, it would appear that the administrators who are looking ahead to their future requirements for managers and executives are becoming increasingly concerned with the need for employing men who are trained primarily in fundamental principles rather than in the practical aspects of the job; men who are able to approach the problems which will confront them with a critical and analytical mind, rather than those who are dogmatic in their thinking and consider that they know all the answers. Organizations are also seeking men who have the ability to deal intelligently with people, for as our profession assumes greater social responsibilities, effective handling of the human relations aspects of the job becomes particularly important in the work of managerial and executive personnel. It is noteworthy that after men attain supervisory positions, their further advancement may well depend more on their ability to work with others and to manage people than on their technical knowledge. Above all else, employers are seeking men with breadth of vision for the present and the future; men who have the urge for continued self-education, aimed at keeping abreast of technical and public relations developments in their fields of interest, and who possess the capacity, as they mature, to grow and develop from technical specialists into managerial generalists.

Repeated reference has been made to the vital importance of communications skills (both oral and written) and public relations abilities as professional attributes. For the forester on the job, meeting shortcomings in these areas is largely up to the man himself, involving not only the recognition and admission of the shortcoming, but also his willingness and determination to attain self-improvement through the application of whatever remedial measures there may be at hand.

Consideration of the needs of practicing foresters for continued education points up the importance of "postgraduate instruction." As the scope of his duties increases into real administrative responsibility, the forester must often deal with fields outside his formal education, fields in which he cannot hope to become technically competent. However, he should gain a reasonable understanding of these specialties, if he is to direct well the work he is expected to supervise. If the administrator is to make a smoothly functioning team out of people with various skills, viewpoints, and talents, he must have not only the capacity to manage men, but also at least some knowledge of the fields they represent. Further, he must know something of the economic and social problems confronting the organization he serves, be it private or public.

These circumstances reflect a need for special adult educational opportunities, such as those in general management areas being offered today in various colleges and universities throughout the country. Our forestry schools have an opportunity and challenge to make a truly significant contribution in the sphere of "postgraduate" education, through *professional-type* short courses, seminars, institutes, conferences, and other forms of intensive, specialized instruction. Among the various areas of need are such subjects as new developments in forest practice and in research, taxation, legal problems, business administration, fundamentals of supervision, labor relations, public relations, and even effective speaking and report writing. Such extra-curricular educational programs have already gained some attention, but the opportunities for effective action still appear very large.

In summarizing these rather random observations, I am taking the liberty of quoting from the conclusions of a Washington Section presentation made by one of my Yale colleagues. "The coming generation of foresters more than ever must be educated for a profession rather than trained for a vocation. The rapid pace with which our civilization is developing may well tend to leave foresters behind if we continue to emphasize technical training based on our past experience and concepts. In this respect, the Harvard Report on General Education makes a significant comment: 'Vocational instruction can come to an end, its purposes fulfilled—but general education is endless since it serves those of man's needs which are inexhaustible.'

"Foresters in the future will have to lean more and more heavily on their ability to think and improvise and invent. They will find that their understanding of trees is no more important than their understanding of people. It is already evident that some of the major problems facing our profession will be in the realms of public relations and politics. In our choice of men to succeed us, these factors must receive important attention."

GEORGE A. GARRATT

The Development of Executive Ability of Foresters[1]

F. C. Gragg

THE EFFECTIVENESS of any organization depends on the competence of the executives that provide the leadership. All business organizations deal with the same ingredients—people, time, materials, and capital—and they must see that these are used efficiently. The wood using industry is not unique in this respect; but it is more sensitive to leadership and more dependent upon the *quality* and *vision* of executive performance than many other fields of endeavor.

It is only logical that executives of forest products industry be developed from foresters. The professional education, training, and experience of foresters should prepare them for leadership in their industry more adequately than any other professional group. This has been slow to develop; it has come slowly, in my opinion, due to the following conditions:

1. Forestry is still a young profession and foresters, as a group, are still regarded in some quarters as immature.

2. Foresters unfortunately tend to view themselves as "specialists."

3. Foresters have failed to prepare themselves to undertake broad business ventures.

4. Employers have neglected to help foresters prepare themselves for executive positions.

5. Forestry schools have not prepared their students to visualize the full panorama of the complete business field of the forest industry. Rather, the schools have instilled in their students the idea that forestry is a highly technical, narrow, and scientific profession.

6. Foresters have failed to appreciate, understand, and become interested in fiscal, legal, accounting, sales, and other economic problems of their employers.

7. Foresters as a group have never fully realized the importance of economics—the relationship between the cost of producing wood and wood products and the problem of selling wood products in competition with substitutes.

8. Foresters have not become interested and proficient in labor relations problems. Most young foresters have new and progressive ideas on forest management; but they have surprisingly archaic ideas about labor relations, particularly about organized labor relations.

9. Foresters have not become proficient in communications. This may be one of our most serious deficiencies.

10. Foresters don't appreciate the full scope of public relations. We are just beginning to understand a few of the basic facts of public relations as they affect the problem of fire prevention, but we have not been deeply interested in the broad problem of human relations and their effect on a business enterprise.

We know that other professions are also concerned about the problem of developing executives from their groups. Most organizations active in the forest industry are deeply concerned with the problem of developing good executive material. As a matter of fact, this is one of the most important responsibilities of any management.

Definitions

There is some mental confusion surrounding the terms executive, administrator, and supervisor. For the purpose of this talk, I would like to use these rough definitions:

A. An executive functions in such a manner that he extends or projects his own efforts, ideas, and concepts to a wide sphere or range almost entirely through the action of others.

B. An administrator activates the policies, programs, and directives of others.

C. The supervisor provides the local leadership and is the key figure in converting ideas, programs and concepts into action.

"Specialists" vs. "Generalists"

One of the most perplexing problems in identifying, selecting, and preparing executive material arises from the fact that such men are brought to light in the first place because they have done an outstanding job in a highly specialized field. They are suddenly faced with the problem of becoming "generalists," which requires that they give up much of the thinking, and the thought patterns which developed the thinking, that helped make them successful "specialists."

At this point, I think we must accept the fact that most foresters simply will never be executives. In the first place, everybody simply cannot be chiefs—there will always be a need for more good Indians than for good chiefs. However, the forest industry must have the most competent executives possible, if it is to remain in the best economic health. Failure to identify, select, and prepare the most competent individuals simply means that new executives will come from the less competent and, therefore, the quality of leadership will be inevitably diluted. In this respect, it is difficult to appreciate the damage that results to the individual, the employer, and to the industry in cases where unsatisfactory executives are placed in positions of leadership. The unhappiest, and perhaps the most frustrated, individuals are those people in executive and supervisory jobs that are misplaced. Many of these people have brilliant minds

THE AUTHOR is regional manager, International Paper Co., Camden, Ark.

[1]A talk delivered at the January, 1959 meeting of the Southeastern Section, Society of American Foresters, Montgomery, Ala.

and are capable of contributing greatly to the industry in their specialized fields. However, they simply are unable to think as "generalists" and have no sympathy for the relationship that must be developed between the specialized fields of interest. In many organizations, the only opportunity to recognize and reward the outstanding services of a brilliant "specialist" is to promote him into a supervisory or executive position where he will probably be unhappy, unproductive, and in most cases, frustrated. His ineptness as a supervisor or an executive may and usually does result in causing a decline in the organizational morale. His frustration usually produces an administration of unbalanced emphasis. Being a "specialist," he thinks like a "specialist," and acts like a "specialist." He places so much emphasis on one single phase of endeavor that the organization has no opportunity to perform as a well-balanced team. The misappointmnt of a supervisor or an executive is a tragedy. First, the valuable services of a brilliant "specialist" are lost to the organization, but of greater importance is the negative value of such an executive to the organization. Too often, these errors of appointment are discovered too late to correct without serious embarrassment to a valuable employee. In an attempt to avoid embarrassment, the man is often left in his position, but the authority and responsibility is minimized. This way out is also a tragedy. It is an attempt to salvage the man's pride, but it results in an attrition of the valuable man's capacity, usually to the point of no return.

Responsibility

Where does the responsibility rest for developing executives? There can be little doubt that the employer has perhaps the greatest financial stake in this matter, but the employee also has a great deal of interest in it. There can be little doubt the schools of forestry have an interest and responsibility in the solution of this problem.

Responsibility of the Schools

The forestry schools recognized by the Society of American Foresters are doing a better job of providing a sound education, technically, to foresters than ever before. It is doubtful that much improvement is being made in turning out better potential "generalists." Great strides have been made in the quality of technical preparation, but the graduate's viewpoint and understanding of the relationship between technical skills on one hand and economic and human relationships on the other has suffered. A good professional forestry school must be more than a "trade school." The humanities must be taught along with silviculture. Some method must be found to broaden the scope of the student's vision, for without realizing it fully, most students develop a thinking habit that presumes that the growing of timber is an end in itself. They simply do not relate silviculture to economics.

Responsibility of Employers

The problem of developing executive material is of great importance to the employer. The continued health and even continued existence of the enterprise depends on a succession of competent supervisors, managers, and executives. How could anything be more important to the enterprise than the development of new management to replace the old? The very existence in the next generation of the forest enterprise that was successful in the last generation depends upon how well the present management prepares to replace itself with new executives, managers, and supervisors qualified to guide the enterprise into the highly competitive future. It is dangerous to assume that, simply because an organization exists, qualified executives will step forward to fill gaps as they develop without previous preparation, testing, or experience. This most important function can no more be left to chance and hope than can sales, production, financing, or legal affairs.

Responsibility of the Employee

The individual forester has a responsibility in this matter that he cannot shift to the schools of forestry, nor to his employer. It is important to his professional career, job satisfaction, and personal happiness that he do all that he reasonably can on his own initiative to prepare himself to undertake supervisory or executive responsibility at any time the opportunity presents itself. Sooner or later, opportunity will knock on the door of the forester that prepares himself. Here, I think a word of caution is in order. Some foresters possess neither supervisory nor executive ability and some are not interested in the field. They have the good sense to realize this and know that they would be unhappy, unsuccessful, and frustrated in such a position. Such foresters, undoubtedly, should continue in the highly specialized work where they fit best, and where they will be of greater value to themselves, the profession, and to the employer. I sincerely hope that forest industry organizations will find adequate means of compensating such competent people and, at the same time, leave them in the work for which they are best equipped and where they will be the happiest.

Preparation

Let us assume that the schools, the employers, and the foresters have all recognized their respective responsibilities. What positive steps can each take to discharge their individual responsibilities?

Preparation by Schools

Sooner or later all the professional schools of forestry should and probably will require entrance examinations. Aptitude testing will be initiated and will be used to discourage entrance of those students who are obviously unadaptable to the practice of forestry. I have long thought it a tragedy of major proportions to find students who have spent four to six years in forestry schools and then find, as some do in the first three months

of employment, that they simply cannot be satisfied in forestry. Such mistakes reflect unfavorably on the schools, and it is their responsibility to try to prevent the entrance of such students. Entrance and aptitude examinations and tests should help to minimize the high percentage of drop-outs during the first two or three years in school.

The schools should develop a system of identifying potential executive material for the purpose of guiding these students into courses of study that will help them to develop into "generalists." Equally, they should try to guide the potential "specialists" into courses of study and development that will help them best to prepare themselves to be "specialists" and, at the same time avoid wasting their time on courses of study such as the "generalist" will need.

Preparation by the Employer

The employer has the greatest economic interest in this matter and has the best decision-making opportunity to take the initiative. Heretofore most employers of foresters have been judging applicants for forestry positions on the basis of the applicant's ability to do routine forestry field work. I am afraid that too much weight has, and still is, being given to the applicant's ability to do relatively simple field work during the first five years of employment and that very little attention has been given to the applicant's probable capacity to grow into supervisory or executive stature in 10 to 25 years. Identifying this potential is difficult but professional personnel people can help to identify the probable "specialists" and the probable "generalists." The employer must decide what he wants and needs, both on a short and long-run basis. He then must select his forestry employees from the applicants that most nearly meet those needs or requirements. Some employers think that every new professional employee should be a potential officer. The writer does not agree with this since "specialists" will be needed who probably never will be interested in becoming supervisors.

The probationary period of employment can be an important tool in selecting professional employees. It provides an extended time from six months to a year for the employer to make a thorough study of the employee's potential capacity and to determine whether or not the employer will permanently need the man's particular ability. It also gives the employee the same opportunity to decide whether or not he likes what he sees of his employer. It is possible to identify, tentatively, the "specialist" and the "generalist" during this probationary period.

Employer Training

Well-planned programs of training for professional employees are necessary to help them develop rapidly. The program by all means must include planned indoctrination. The history of the organization, its products, plans, policies, and objectives, as well as its eccentricities, should be explained to the new forester. It cannot be assumed that the employee will learn all of these things and understand them fully, simply because he has worked in the organization. Every forester should be given a formal, detailed explanation of the organization with which he is starting his career. It makes no difference whether it is public or private. Those in supervisory and executive positions would be shocked at the deficiencies of understanding of basic organizational philosophy that exists in the minds of forestry personnel. A few well-chosen questions readily would reveal these deficiencies and highlight the importance of proper indoctrination of all new employees—and probably some not so new.

Many forestry organizations have gradually become specialized during the past 20 to 25 years. Groups have developed that handle only parts of the organizational forestry work. As the years have gone by, these groups have grown farther and farther apart in experience, interest, and outlook. This may have resulted in a somewhat more efficient approach to the several separate phases of work; but, it has reduced the opportunity to provide proper well-rounded training and experience to potential supervisors and executives.

Training on the job provided by employer.—It is so important that job content be as broad as possible that some sacrifice in efficiency inherent in the specialized group approach is entirely justified. International Paper Company has recently completed a reorganization of its Woodlands Department. This drastic change was made to a considerable extent for the purpose of improving the opportunities to develop the managerial skills, breadth of vision, and personnel development of the forestry organization. The sacrifice of certain special skills was minimized by the establishment of a technical staff responsibility. Assignment for limited periods to this type of position is in itself used as a training phase in the development of a forester to help him visualize a broader field of responsibility. Training, if you please, for supervisory and executive positions in the future.

The employer of a large forestry organization should develop a well-rounded plan of training on the job. Training, if it is to accomplish the purpose of developing well-rounded, broad-minded supervisors and executives, must be well-planned. Effective training programs do not just happen; they are brought into fruition by imagination of the forward looking minds of current management. The progress of each forester needs to be soundly assessed each year. If he has obtained all the experience that he needs from his present job and he can be economically replaced at the present time, consideration should be given to an immediate change of job by promotion or transfer to another job where he can further broaden his experience. It is not suggested that the organization exist for the purpose

of training foresters. Obviously, the training of foresters is a means to an end and not an end in itself. Supervisors and executives very often attempt to justify failure to provide a variety of job experience to employees on the basis of expense of changing jobs and moving people, breaking in employees on new jobs, and of loss of efficiency. The real reason is that they simply are taking the easy way out. They find it less trouble to leave experienced people on the same job for long periods of time. They prefer to fill vacancies by promoting people, involving a minimum of job changes. I'll admit that this is easier on the supervisors, but inevitably, they will face the necessity of filling a job with an unprepared person. The supervisor should realize that the skill that he displays in developing personnel is the gauge by which his own progress in the organization will sooner or later be determined. The organization that develops a positive and intelligent personnel development program will be the successful organization of the future.

An imperative part of a good personnel development program is periodic personnel rating or performance appraisal. It should also be done at the time of each job change. This is a task that the supervisor should take very seriously. Professional personnel people have developed this into a relatively exact science. The program is an essential tool in appraising the employee as to his progress and to the employer in adjusting the course to be followed in the future training program of that employee. It also is a useful tool to the employee in shaping and altering his self-improvement program. It is not an easy tool to use, however. It should be undertaken only with intelligent and preferably professional guidance. There are many pitfalls to trap the amateur psychologists. Supervisors have their human weaknesses, and these weaknesses will negate the rating program unless the raters are adequately trained by competent people.

Supervisory counseling by employer.—Personnel rating, to be of much value, must be followed by supervisory counselling. This need not be of the paternalistic variety, but the supervisor should take the time and the trouble quite often. As a minimum he should sit down with the employee at rating time, specifically for the purpose of discussing his job performance. The whole range of strengths, weaknesses, experience, adequacies, inadequacies, personality, and human relationships, as well as educational assets and deficits, should be discussed. A very specific program should be designed, covering the action which the employee can and will take to help overcome his weak points. At the same time, the supervisor should try to get the employees to agree on a positive program of self-improvement. Arrangements should be made to follow-up and determine how he makes out on this program. The supervisor should explain any training plans he has to help the employee improve his performance.

Internal educational program by the employer.—The most progressive industrial employers of foresters have already undertaken a large number of internal educational programs. The programs are quite varied and cover a wide field, but they are all aimed at the goal of improving the individual's effectiveness in the organization. Many of these programs basically are courses in applied psychology. Although many are technical, practically all of them are designed to help the employee become more effective as a supervisor and to help him live a happier, better adjusted life, both on the job and off. The programs are becoming so important that a forester may receive an impressive, formal education over a period of 10 to 20 years. I will not try to enumerate all of them, but it is interesting to note that most of them are very important to the development of supervisors and executives. Most foresters have no education in labor relations, and since this is an important field employers must, and are, providing the internal education to supervisory and executive personnel. The courses are sometimes taught by the professionals in the Labor Relations Department of the employer, and sometimes by University people brought in temporarily for that specific purpose.

Included in this educational program inside the employer's organization is the important subject of communications. In my opinion foresters and engineers both have suffered in competition with men of liberal arts education because too many of them express themselves so poorly in both oral and written form. Too many otherwise competent foresters are so unfamiliar with the use of the English language that they appear to be almost illiterate. In my opinion, no employer should find it necessary to provide internal formal education in letter writing, report writing, public speaking, and other means of communications; but, the fact remains that to develop good supervisors and executives many employers are faced with the necessity of providing this education.

The employers should, and in many cases are, providing internal education in human relations. These courses were originally found to be effective for sales people, but are now considered to be equally valuable for supervisors and executives. The realization has come that the organizations with happy human relations are the organizations most likely to be productive.

A few organizations that employ foresters are now providing some formal education in practical economics. More of this can be expected, particularly for the prospective top supervisors and junior executives. Foresters, especially, need supplementary practical education in the cost-benefit ratios that exist between operations, budgeting, costs, taxes, profits, and alternative investments. If foresters are to develop into good supervisors they need preparation in the economics of their industry and in the special economic opportunities and problems of their employer. Only

the employer can possibly provide this special training.

External education—supplementary—by the employer.—There is a growing tendency for industrial organizations to make use of the facilities of colleges and universities in supplementing the educational needs of top supervisors and junior executives. This is an excellent solution to some of the problems faced by the employer in developing executives from foresters. The many short courses on numerous subjects have been of great help in supplementing the education of key employees. The series of Industrial Forestry Seminars being given by Yale, the top level business courses conducted by the School of Business Administration at the University of Georgia, the Executive Business Courses available at Harvard—all are outstanding examples of the supplementary education that industry is now arranging for its prospective executive personnel. Foresters are included in the enrollment of most of these courses now. This supplementary education is expensive to the employer. Some of these courses run for as much as a year. This is an indication of the importance attached by industry today to planned development of executives. An educational background that was adequate for executives of a generation ago leaves much to be desired under rapidly changing and highly competitive conditions of today. I expect that the institutions of higher learning and the employers of foresters, especially the forest industries, will be developing closer working relationships. The development of special postgraduate courses to fit the needs of the employees will be expanded and this trend will also encourage cooperative research work to be undertaken by the colleges and universities for the forest industries. Several such projects in the field of geneties are already underway. The scientific results will be worthwhile from a financial standpoint, but the extra dividends will be a new understanding by both of what they can do for each other. In this writer's opinion the near future will see employers selecting supervisors and junior executives and setting them out on a precisely laid out course of study on the job and at the university. These plans will also include equally carefully planned job programs, all for the purpose of developing a broader and better equipped executive.

Employer's on-the-job training.—Supervisors and executives learn and become proficient eventually, like everyone else, by doing the job. Regardless of the amount of education, external or internal, there are many aspects of a new assignment that can only be learned by experience. It is impractical to expect a new supervisor or a new junior executive to emerge full-blown as soon as he takes on a new position, unless he has had some on-the-job experience in advance. Arrangements to provide this necessary experience are never easy to make. It is always somewhat expensive and awkward; but, any organization that has the responsibility for perpetuating itself is negligent if it fails to have at all times at least one or two people in training to replace each key supervisor or executive. Each key employee should be replaced by a person in training for his job during any absence from the job. This should be done at any time an absence of a week or more occurs. It certainly should be done during vacations or extended illnesses. If the key employee does not take vacations, get sick, or attend conventions, he simply should be relieved from time to time, and his understudy should be allowed to take over and run the job with full responsibility and authority. What better way is there for a man to be prepared for promotion than this? The practice of some supervisors and executives to leave their jobs for vacations and other extended periods without arrangements for a temporary replacement shows little appreciation for the training needs of subordinates. The maximum benefits of training can be obtained only if the employer is willing to delegate the full limit of authority and responsibility to the acting supervisor or executive and to make it quite clear to the organization that the man is in actual charge for the specific period.

Temporary special assignments provided by employer.—The employer interested in developing promising foresters into top supervisory and junior executive positions would do well to consider assignments of such people from time to time to special projects. It is especially recommended that assignments, where it is necessary to break new ground, be given to these men. Special jobs that have never been done before, jobs where ingenuity and imagination are necessary, and jobs that test to the fullest such traits as perseverance, patience, and tact, are all especially recommended as training or testing positions for prospective executives.

The larger organizations can make good use of formal policy meetings to which prospective junior executives are invited. Such policy sessions can provide a background that is difficult to give by any other means. The chance to hear discussions regarding the possible cause and effect of various courses of action can provide an insight into organizational mysteries, that may never be possible by planned programs. This inclusion of prospective top supervisors helps to develop their self-confidence as well as their mental perspective for greater responsibility.

Just one last admonition for employers. If the employer is serious about developing supervisors and executives, he must be ready, willing, able, and anxious to delegate authority and responsibility. Certainly there are risks and certainly mistakes are going to be made. Certainly he is going to regret his delegation in some instances. Certainly some personnel are not going to measure up to expectations. Certainly he is going to lose some money and suffer some embarrassment about some of the mistakes that these people will make; but, it must be realized that these mistakes are a part of the process of learning. Employers should be cautioned against extending au-

thority and then gradually withdrawing such authority with each mistake. The young supervisor will eventually find himself so restricted that he will be unable to act. Without the employer realizing it, the employee slowly has been stripped of authority and left him with a responsibility that cannot possibly be discharged.

Preparation by the Forester

Let us consider the responsibility and opportunity of the individual forester to prepare and develop himself into the most useful forester that his capacity will permit. First, of course, it is his responsibility to obtain the best possible professional education that he can. In this connection sound counselling and the willingness of the individual to follow the course of study recommended by the counselor are quite important. Many students are looking for easy electives and often disregard the electives recommended by counselors that would be very valuable in filling deficiencies in the student's preparation for a professional career.

The mental attitude the employee has toward his employer and toward his fellow employees is a foundation upon which the relative success of his career will rest. Fortunate is the forester with the capacity for enthusiasm. This trait possibly cannot be acquired, but it can be nurtured, improved, and developed. The forester who can be enthusiastic about his position and assignment, and who can spread that enthusiasm to his fellow employees is already demonstrating an important asset that can mark him as a potential executive. I do not know of any substitute for enthusiasm and optimistic approach to all of a forester's problems. I have observed highly competent, though pessimistic, foresters fail where optimistic, enthusiastic, and perhaps less technically competent ones have been highly successful. Life, itself, is a great deal better to live if your associates and especially your superiors are optimistic and enthusiastic.

The forester that aspires to executive responsibility ought to recognize the urgent need to develop his communicative skills. The executive with limited ability who speaks and writes effectively is always more productive than the genius unable to convey clearly his ideas to other people. I have heard more severe criticism leveled at foresters about poor report writing than about almost any other deficiency. The ambitious forester would do well to try to improve himself in this respect; letter writing should be included in this category, too.

Public speaking is a difficult task for many foresters, and most prefer to avoid it if they can. The growing supervisor and prospective executive, however, will find it necessary to develop his public speaking ability to an acceptable extent. The ability to express himself clearly, to a large audience or to a single person, is tremendously important to the executive. Top supervisors and executives depend almost entirely on their power of persuasion to accomplish their objectives. They accomplish very little really by directives. The understanding and concurrence of subordinates is always necessary to really attain the desired results from an instruction or from a directive. The executive depends on his power of persuasion with his employees, with his customers, his fellow supervisors, his superiors, his labor unions, his public officials, his friends; yes, even with his family. The forester that fails to develop his ability to talk effectively is not very likely to find himself burdened by the responsibility of an executive position.

One other matter is closely associated with communications: the fundamentals of parliamentary procedure. Foresters are not alone in this deficiency; however, any forester that cares to take a little time to study parliamentary procedure can accomplish his objectives in almost any type of a meeting. This is true, sadly enough, simply because most are so inadequately prepared to defend their ideas under parliamentary rules. All foresters should improve their parliamentary dexterity if they wish to improve their ability to obtain acceptance of their ideas.

All foresters — and especially those aspiring to executive positions—should become as familiar as possible with other branches of their employer's business as they can. It is impractical to become highly skilled in numerous specialized phases of work; but, it is important to have a good working knowledge *of* and an appreciation *for* the services rendered to the organization by the accountant, the engineer, the attorney, the salesman, the manufacturing people, research personnel, financial, statistical, and clerical employees. All of these people perform vital services. They also aspire to the supervisory and executive positions. It is necessary for the forester to develop a degree of understanding of these activities before he can, as a supervisor or executive, mold them into the most efficient organizational team.

No executive can possibly attain professional proficiency in all fields, but he must develop good working knowledge of the scope, methods, limitations, functions, and contributions each group can make to the objectives of the organization. Too many foresters simply do not seriously try to develop an understanding of the basic, legal, accounting, sales, fiscal, labor, and other non-forestry problems, procedures, and resulting policies of their employing organizations. Foresters who take the attitude that these matters do not interest nor concern them will never be ready to undertake top supervisory nor executive positions.

Regardless of whether or not an organization has a labor union contract, it does have a labor policy, good or bad. If the forester is interested in attaining a position of leadership he must learn to appreciate and understand these policies and how they came into being. In case there is a contract, he should learn its contents carefully, and as far as possible the background of the organization's labor manage-

ment relationship. There is no question that the executive of the future will find labor relations of increasing importance. The preparation which one makes to understand and become adept in this field will have a bearing on his progress in the organization. There are perhaps some foresters who hold reactionary labor relations opinions; perhaps some are employed by organizations whose policies are based on the assumption that labor management act of 1939 and other labor management legislation will eventually be repealed. Nevertheless, everyone should take advantage of every opportunity to further his knowledge of the principles of good labor relations. Professional labor relations personnel employed by the organizations do not relieve us of the responsibility for understanding and appreciating the necessity for maintaining good relations for all of the employees of our organization.

Most foresters are interested in public relations. This is so much a part of our daily lives from the day we start to work that it hardly seems necessary to include a public relations admonition here. A good record demonstrating proficiency in public relations activities is an asset that many foresters have. It has helped many attain some measure of recognition, and has been the means by which their other attributes have been called to the attention of their employers.

It is important for the ambitious forester to recognize the fact that he must develop himself as a well-rounded individual. He must develop his personality and develop himself as a useful citizen in the community in which he lives. As a matter of fact, the supervisor who finds time to develop an interest in, and make contributions to the welfare of his community is usually a better supervisor than he would be if he failed to discharge these phases of his responsibility. Certainly a forester should find time to devote to his professional society, and to make any worthwhile contributions that he can. It is also important that he become interested in, and contribute whatever he can to the appropriate trade associations. If at all possible I would suggest that the ambitious forester become an active member of one of his local civic clubs and participate enthusiastically. I think it is also important for him to make a conscious effort to become interested in some purely cultural activity. If at all possible, it certainly is worth his while to develop an interest in some sport in which he can participate actively, I doubt that any supervisor or executive is ever as effective as he might have been unless he is an active participant in his church.

By way of conclusion, foresters should recognize that their own attitudes and actions determine the progress which they make in the organizations. We, of course, always try to find some reason why we have not attained the goals to which we aspired. We usually find some person, some thing, or some event which we can blame for our failures. However, in our calmer moments when we examine ourselves carefully I think that in strict honesty we must eventually agree with Shakespeare's statement, "The fault dear Brutus is not in our stars, but in ourselves that we are underlings."

First Forest Science Monograph Issued

The first *Forest Science Monograph* entitled "Private Forestry in Norway —A Case Study in Small Woodland Management and Policy" by John A. Zivnuska is being mailed concurrently with the June issue of *Forest Science.*

Forest Science Monographs are distributed to all subscribers of *Forest Science* without extra charge. Individual copies of the monograph may be purchased from the Society for $1.

Injury to Coniferous Tree Seedlings by the Oblique-Banded Leaf Roller

John B. Simeone and John H. Engelken

UNTIL RECENTLY, injury by the oblique-banded leaf roller *Archips rosaceana* (Harris)[1] (Lepidoptera: Tortricidae) (Fig. 1) has been reported only on deciduous plants. Several authors have described the insect as a general feeder on these plants. Martin (*5*) extended the list to include a conifer, Scotch pine *Pinus sylvestris* L., among the insect's hosts in Ontario. Since there appears to be no other reference in the literature describing the activity of this insect on conifers and in nursery seedbeds, it seems desirable to document its injury to coniferous seedlings, to comment briefly on the ecological implications and to suggest possible chemicals for its control.

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[1]The writers are indebted to Dr. J. F. Gates Clarke of the Smithsonian Institution for his identification of the adult insects.

Damage was experienced during the last two weeks in July and the first week in August of the years 1956, 1957 and 1958 in the shaded, 4′ x 12′ seedbeds of the State University College of Forestry Experiment Station in Syracuse, New York. The injury was the result of activity by the larvae which, according to Greenwood (*4*), who studied the life history of the insect in central New York, are believed to be those of the second brood. The seedlings were damaged in two ways: (1) individuals were stripped of their leaves by the larvae (Fig. 2); and (2) small groups were drawn together with silken strands produced by the larvae preparatory to pupation (Fig. 3). In the latter case, from three to seven seedlings, some of which had been fed upon, were used by each larva. The binding activity of the larvae proved lethal to the majority of seedlings in each group, causing the leaves to turn from green to pale yellow and, finally, to brown. It was not ascertained whether death resulted from a disturbance of the root system by the combined tensions exerted from the silken strands and the suspended weight of the larva or whether it should be attributed to some unknown cause.

FIG. 1.—Pupa, *left*, and adult, *right*, of the oblique-banded leaf roller (6X).

Most affected were seedlings of eastern white pine *Pinus strobus* L., Scotch pine *Pinus sylvestris* L., and red pine *Pinus resinosa* Ait. for each of which it was estimated that 0.5 percent to 1.0 percent were killed in 1956, the year when the heaviest damage took place. Within these species, 1-0 stock was affected more than the 2-0. Other coniferous seedlings affected, but to a lesser extent, were jack pine *Pinus banksiana* Lamb.; Austrian pine *Pinus nigra* Arnold, white fir *Abies concolor* (Gord. and Glend.) Lindl., Douglas-fir *Pseudotsuga menziesii* (Mirb.) Franco, Japanese larch *Larix leptolepis* (Sieb. and Zucc.) Gord., white spruce *Picea glauca* (Moench) Voss, and Norway spruce *Picea abies* (L.) Karst.

A number of seedlings of other species were present in the same rows or in nearby beds but were not attacked. These included northern white-cedar *Thuja occidentalis* L., eastern hemlock *Tsuga canadensis* (L.) Carr., black spruce *Picea mariana* (Mill.) B. S. P., blue spruce *Picea pungens* Engelm., red spruce *Picea rubens* Sarg., balsam fir *Abies balsamea* (L.) Mill., and noble fir *Abies procera* Rehd.

It was of interest to consider some of the circumstances under which the larvae might have chosen to occupy this particular ecological niche. Food did not appear to be the primary attractant since the amount of foliage consumed was not sufficient to account for the large number and size of the lar-

vae. A more logical explanation was found in two disturbances that occurred in and around the seedbeds. The first of these was the possibility that the original hosts of the insect were removed during hand weeding of the beds and the larvae simply migrated to the seedlings. These weeds included several species of Labiatae and Gramineae and the species *Glechoma hederacea* L., *Oxalis* spp., *Trifolium* spp., *Equisetum arvense* L., *Stellaria media* (L.) *Cyrillo*, *Onoclea sensibilis* L., *Convolvulus arvensis* L., *Chenopodium album* L., and *Capsella Bursa-pastoris* (L.) Medic. Of these, *Trifolium* has been mentioned as a host by Forbes (*2*).

The second possibility was that the larvae may have migrated from nearby weeds or cover crops when these were mowed. Red clover *Trifolium pratense* L. was used extensively as a cover crop in some of the idle seed beds, and there is some indication that the larvae may have come from this source. Several larvae were found feeding on these plants during the summer of 1957. Unfortunately, however, no further evidence was found during the summer of 1958 to help strengthen this assumption.

Since all the larvae found were either in their final or in their penultimate instars, nutritional attraction appeared to have little bearing on their presence in the seedbeds. It was concluded, rather, that the larvae selected the seedlings primarily as a suitable place in which to pupate. This phenomenon strengthens the statement by Dethier (*1*) that ". . . we should not expect *a priori* a close correlation between nutrition and plant preferences. The end served by food plant preference is neither solely nor primarily a nutritive one, and in order to appreciate the evolutionary trends in feeding preferences it is desirable to inquire first into the mechanism of the phenomenon."

The light amount of damage during the 1957 and 1958 seasons made it unnecessary to attempt any control by chemicals. However, if such should become a necessity in the future, there are certain chemicals which may warrent trial on the basis of their effectiveness against two closely related tortricids, the fruit tree leaf roller *Archips argyrospila* Wlk. and the red-banded leaf roller *Argyrotaenia velutinana* (Wlk.). Against the former in apple orchards the United States Department of Agriculture recommends either 2 pounds of DDT 50 percent wettable powder or 4 pounds of lead arsenate and 4 pounds of hydrated lime per 100 gallons of water (Vance, *6*). Against the latter the same authority recommends the following in 100 gallons of water: 3 pounds of lead arsenate and 3 pounds of hydrated lime, or 1 pound of parathion 15 percent wettable powder, or 1½ pounds of

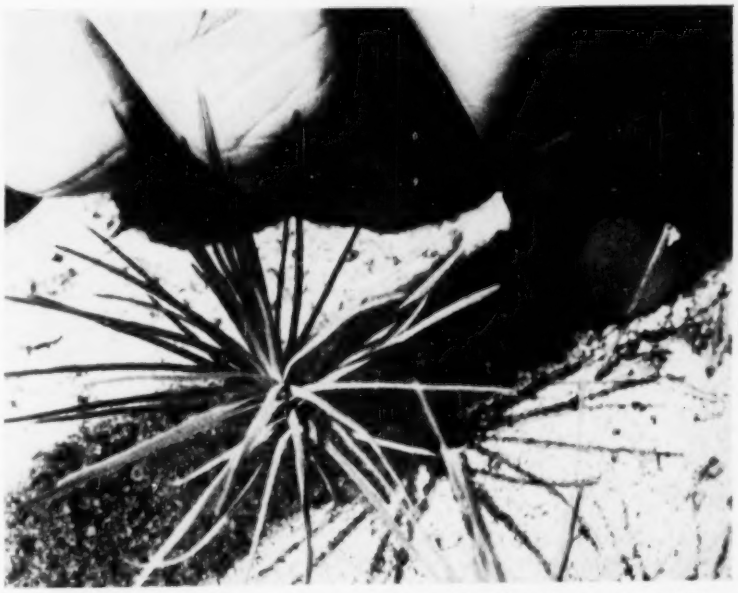

FIG. 2.—Normal seedling, *left*, compared with defoliated seedling, *right* (1½X).

FIG. 3.—Larva webbing together several seedlings prior to pupation (2X).

TDE 50 percent wettable powder. To overcome some resistance displayed by the red-banded leaf roller against TDE, which for several years has been considered one of the most efficient insecticides against this insect, Glass (*3*) recommends mixing TDE or lead arsenate with parathion or malathion.

Literature Cited

1. DETHIER, V. G. 1954. Evolution of feeding preferences in phytophagous insects. Evolution 8, 1: 33-54.
2. FORBES, W. T. M. 1923. The Lepidoptera of New York and neighboring states. Cornell Univ. Agric. Exp. Sta. Mem. 68, 729 pp. Illus.
3. GLASS, E. H. 1958. Red-banded leaf roller and DDT. Farm Research 24, 1: 13.
4. GREENWOOD, D. E. 1942. Field identification of five leaf rollers found in apple orchards. Cornell Univ. Agric. Expt. Sta. Bull. 698: 55-58.
5. MARTIN, J. L. 1958. Observations on the biology of certain tortricids in young coniferous plantations in southern Ontario. The Can. Ent. 90, 1: 44-53.
6. VANCE, A. M. 1957. Insecticide recommendations of the Entomology Research Division for the control of insects attacking crops and livestock, 1957 season. U. S. Dept. of Agric. Agric. Handbook 120, 109 pp.

Inland Empire Section States Policy on Wilderness

The following text of a letter under date of March 27 was prepared by the Wilderness Study Committee of the Inland Empire Section and addressed to Hon. James E. Murray, chairman, Senate Committee on Interior and Insular Affairs, with copies to a number of other public officials.

The Inland Empire Section of the Society of American Foresters is a group of professional men who are trained in all aspects of wild land management. Members are employed by private industry, State and Federal Agencies, and a few are self employed.

These professional foresters are vitally interested in the wise use of our wild land resources and insuring their perpetuation and balanced use. This is a result of their training and of their life work.

One phase of wild land management given special study by our section during recent years is wilderness areas. This study included discussions, seminars, and visitation to the Selway Wilderness Area.

Our section has just completed a secret poll of members concerning wilderness policy. A total of 128 ballots were cast. The five questions and results are shown in the accompanying table.

Results of this poll are sent you since the considered opinions of these dedicated professional foresters and conservationists may be helpful in reaching a just, enlightened and enduring solution.

QUESTION	Ballot results: Yes	No	No opinion
1. Are you in favor of the passage now of any bill essentially the same as S. 4028?	9	119	
2. Do you approve of a National Wilderness Preservation Council composed of the Secretaries of Interior, Agriculture, Smithsonian Institution, and three citizen members whose qualifications need only be "informed regarding, and interested in, the preservation of wilderness," as outlined in Sec. 4 (a) of S. 4028?	8	117	3
3. Are you in favor of the Congress passing a bill which would place large responsibility in Congress and the President in the designation and policy of administration of wilderness areas?	11	113	4
4. Are you in favor of the passage of a wilderness bill that simply recognizes wilderness as one of the multiple uses of federal lands, defines their prerequisites, and authorizes the federal agencies to create them from lands under their jurisdiction after public hearings and to administer them?	89	31	8
5. Are you in favor of postponing consideration of any wilderness bill until the recently appointed Outdoor Recreation Resource Review Commission has made its reports in 1961?	105	19	4

ROYCE COX, *Chairman*
RAY BOYD
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Storing Loblolly Pine Seed in Polyethylene Bags as a Substitute for Stratification

**John F. Hosner,
Richard E. Dickson,
and Leslie Kahler**

THE SEEDS of most loblolly pine seed lots exhibit some degree of dormancy. That is, perfectly sound and uninjured seeds fail to germinate adequately even when conditions of temperature, moisture, oxygen, and light are suitable. According to the U. S. Department of Agriculture (*3*) the dormancy is caused by internal conditions of the seed. In nursery work it is not only desirable, but necessary to overcome this dormancy for two reasons: (1) to increase the percent of total germination and (2) to shorten the germination period. The latter is particularly important because high winds, heavy rains, unseasonablly cold weather, damping-off and other agencies are more likely to be injurious during a protracted germination period. A shorter germination period also insures more uniform seedlings.

Ever since Barton (*1*) pointed out the feasibility of stratification, it has been generally used as a pregermination treatment for loblolly pine. However, as summarized by Wakeley (*4*) many other pregermination treatments have been tried as substitutes for stratification of conifer seed exhibiting internal seed dormancy.

The present study describes the results of a test comparing storage of moistened seeds in sealed polyethylene bags to stratification in moist sand as a pregermination treatment for loblolly pine (*Pinus taeda* L.).

Methods

The U. S. Department of Agriculture (*3*) recommends 30-90 days stratification in a moist sand or peat medium for loblolly pine seed, although it is recognized that shorter periods may be satisfactory. To compare the effectiveness of storing moistened seed in polyethylene bags to the standard treatment of stratification, the following treatments and check were set up:

1. Sixty days storage in sealed polyethylene bag of seeds moistened in water.
2. Sixty days storage in sealed polyethylene bag of seeds moistened in a fungicide solution.
3. Ninety days storage in sealed polyethylene bag of seeds moistened in water.
4. Ninety days storage in sealed polyethylene bag of seeds moistened in fungicide solution.
5. Sixty days stratification in moist sand of seeds moistened in water.
6. Sixty days stratification in moist and of seeds moistened in fungicide solution.
7. Check—no pregermination treatment.

Lots of 100 seeds were randomly selected. The fungicide solution consisted of Captan 50 used at the rate of two pounds per 100 gallons of water. The moistened seeds were immediately placed in the bags and kept in cold storage at a temperature of 36-38° F. The tops of the polyethylene bags were folded over and closed with a rubber band. Each treatment was replicated four times making a total of 400 seeds per treatment. The start of the treatments was staggered to end all on the same day.

Germination tests following the treatments were made in flats of moist sand. Counts were made every two days of the seedlings whose cotyledons or adhering seed coat cleared the ground. Counting was continued until the 47th day when there was a stretch of four consecutive days with no new seedlings from any lot. The results were treated by analysis of variance to determine if significant differences occurred in either total germination or the time required for the seed to reach 90 percent of total germination. The results are enumerated below.

Results

Based upon an analysis of variance and subsequent sequential tests as described by Snedecor (*2*), there were no significant differences between the means of seed lots treated with the fungicide as contrasted to immersion in tapwater. No noticeable fungi developed in any of the seed lots. Thus the fungicide treatment is ignored in the following discussion. The results of the germination tests are shown in Figure 1 and Table 1. Stratification in sand gave the highest percentage of total germination but it was not significantly better than storage in polyethylene bags although it was significantly better (at 5 percent level) than the check. There was no significant differences in total germination between the bags and the check. The seeds stored 90 days in polyethylene bags attained 90 percent of total germination in the shortest time but the differences among treatments were slight and were non-significant. However, all three pregermination treatments required significantly fewer days (at 1 percent level) to reach 90 percent germination as compared to the check.

Discussion

Based upon the above test it appears that storage of moistened seed in polyethylene bags is an adequate substitute for the standard

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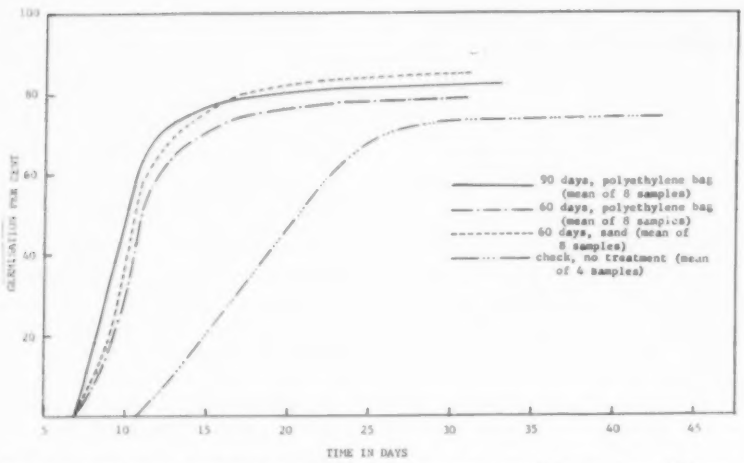


FIG. 1.—Cumulative germination of loblolly pine seed according to three different pregermination treatments and a check.

TABLE 1.—GERMINATION PERCENTAGES AND NUMBER OF DAYS REQUIRED TO ATTAIN 90 PERCENT TOTAL GERMINATION FOLLOWING FOUR PREGERMINATION TREATMENTS OF LOBLLLY PINE SEED[1]

Treatment	Total germination percent	Days required to attain 90 percent total germination
90 days—polyethylene bag	82.4	14
60 days—polyethylene bag	79.0	15
60 days—sand	84.8	15.5
Check—no treatment	74.8	24.5

[1]Figures shown for the check are a mean of four. The others are a mean of eight.

treatment of stratification in sand. It is much simpler inasmuch as there is no medium adding bulk and necessitating mixing and separating of seed. The commonest type of dormancy of forest tree seed is caused by internal conditions of the seed (*3*). There seems to be no reason why this method could not be used with satisfactory results with all other species exhibiting a similar type of dormancy. It has been used with satisfactory but not conclusive results at the Illinois State Tree Nursery at Jonesboro and is currently being used successfully with small lots of conifer seeds at the College of Forestry nursery in Syracuse, N. Y. The polyethylene bags stored at 36-38° F. create an environment that meets the requirements for breaking internal dormancy. The sealed moisture maintains an essentially saturated atmosphere, yet the polyethylene bag permits an exchange of gases facilitating adequate aeration. To insure adequate moisture it might be desirable to soak seeds with thick absorbent seed coats in water for several hours prior to storage in the polyethylene bags. Problems of heating may appear where large quantities of seed are treated at one time. However, using large bags and spreading the seed in a relatively thin layer would at least partially alleviate this potential problem. Occasional mixing might also be desirable with large seed quantities.

Summary and Conclusion

Storing moistened loblolly pine seed in polyethylene bags was compared to stratification in sand as a pregermination treatment. The treatments were as follows:

1. Storage of seed moistened in water and in fungicide solutions in polyethylene bags for 60 and 90 day periods.
2. Stratification in sand for 60 days. One-half the seed lots also were treated with fungicide.
3. Check — no pregermination treatment.

No differences in germination were noted between the seed lots that were treated with a fungicide solution as contrasted to no fungicide. Although total germination in sand was slightly higher than that obtained from seed stored in the polyethylene bags there were no statistically significant differences in either the percentage of total germination nor the number of days required to reach 90 percent of total germination. However, stratification in sand gave significantly higher results than the check for total germination. All treatments resulted in significantly shorter periods to reach 90 percent of total germination as compared to the check.

Based upon this study and practices at two different nurseries, storing small samples of moistened seed in polyethylene bags shows promise as a substitute for stratification in sand as a pregermination treatment to break internal seed dormancy. However, additional tests with different species and different quantities of seed are needed before it can be recommended without reservations on a more universal basis.

Literature Cited

1. BARTON, L. V. 1928. Hastening the germination of southern pine seeds. Jour. Forestry 26:774-785.
2. SNEDECOR, GEORGE W. 1956. Statistical methods applied to experiments in agriculture and biology. Iowa State College Press, Ames.
3. U. S. DEPT. AGRIC., FOREST SERVICE. 1948. Woody-plant seed manual. Mis. Pub. 659. U. S. Govt. Print. Off., Washington.
4. WAKELEY, PHILIP C. 1954. Planting the southern pines. U.S.D.A. Agric. Mono. 18. Govt. Print. Off., Washington.

The Effect of Specific Gravity Separation on Some Common Indices on Loblolly Pine Seed Quality[1]

George L. Switzer[2]

NORMALLY the processing of coniferous seed is terminated after dewinging and cleaning. At this point most impurities for the greater part are eliminated. However many empty or blind seed still remain and because of the problem of distinguishing them from full or sound seed they are not usually classed as impurities. Baldwin (*1*) points out the complications of such seed in lots used for nursery sowings and direct seeding. This paper presents results of :(1) further seed processing aimed at empty seed removal by employing specific gravity separation, and (2) the effect of this separation on some of the common indices of seed quality.

THE AUTHOR is associate professor, School of Forestry, Mississippi State University, State College.

[1]Journal Contribution No. 750 of the Mississippi Agric. Expt. Sta.

[2]The author is indebted to personnel of the Seed Technology Laboratory, Mississipi State University, for assistance in the separation and to W. J. Drapala for assistance with the statistical analysis.

Materials and Methods

A 440 pound lot of dewinged and cleaned loblolly pine (*Pinus taeda* L.) seed collected on the Northeast Mississippi Experimental Forest in 1957 served as the material for these studies. Based on cutting tests this seed averaged 65.8 percent sound prior to separation. The lot was processed on a specific gravity separator (gravity table) employing a wire deck. This separator is described by Welch (*6*). Seed were collected at six different positions as they passed off the deck. The separates were then dried to a moisture content of 7 percent, sampled, and placed in dry storage at 25° F.

Indices of seed quality determined were (1) viability by both cutting and germination tests, (2) number of seeds per pound, (3) weight per bushel, and (4) a new index of seed viability, Czabator's (*2*) germination value. The cutting tests were conducted on 100-seed samples from each of the six separates and replicated six times. Germination results are based on 100-seed samples of each separate replicated three times. Germination tests were conducted in the greenhouse for a period of 30 days, starting April 26, 1958, on seed which had been stratified in moist sand at 42° F. for 45 days. The number of seed per pound were determined from 500-seed samples of each separate in the manner described by Wakeley (*5*) and were replicated four times. The weight per bushel (Winchester) was determined for each separate by the method described by the Agricultural Marketing Service (*3*) and replicated three times. Czabator's method of determining germination value was employed to evalu-

TABLE 1.—THE AVERAGE NUMBER OF SOUND SEED PER 100-SEED SAMPLES BY GRAVITY TABLE POSITION[1]

Gravity table position	Number of sound seed
1	100.0
2	99.7
3	96.2
4	84.5
5	35.7
6	0.0

[1]L.S.D. to compare position means at the 0.05 and 0.01 levels are 4.5 and 6.1 respectively.

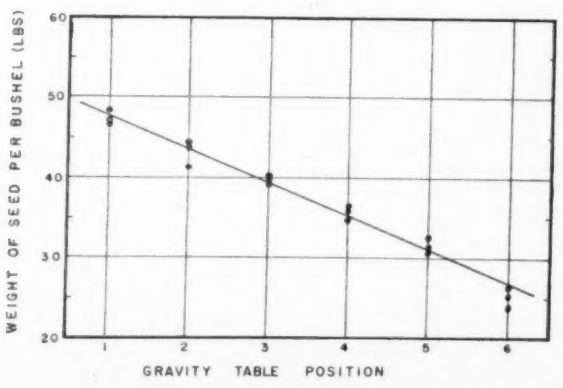


FIG. 1.—The weight per bushel as influenced by gravity table separation.

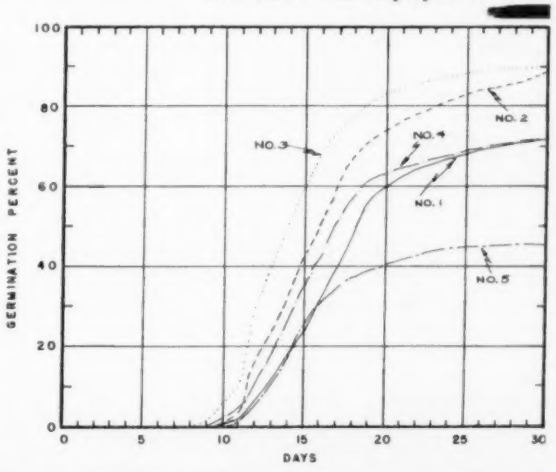


FIG. 2.—The average cumulative and total germination of gravity table separates at 30 days.

TABLE 2.—THE RELATIONSHIP OF GRAVITY TABLE SEPARATES TO THE WEIGHT AND VOLUME OF THE ORIGINAL SEED LOT

Gravity table position	Separate weight	Percent of total weight	Number of bushels	Percent of total
1	144	32.8	3.1	27.7
2	134	30.5	3.0	26.8
3	53	12.0	1.3	11.6
4	27	6.1	0.8	7.1
5	33	7.5	1.0	8.9
6	49	11.1	2.0	17.9
Total	440	100.0	11.2	100.0

TABLE 3.—THE AVERAGE NUMBER OF SEED PER POUND BY GRAVITY TABLE POSITION[1]

Gravity table position	Number of seed per pound
1	14,698
2	15,338
3	15,244
4	16,004
5	19,336
6	24,147

[1]L.S.D. to compare position means at the 0.05 and 0.01 are 597.8 and 826.7 respectively.

TABLE 4.—THE AVERAGE TOTAL GERMINATION, IN PERCENT, AT 30 DAYS OF SEED SEPARATES BY GRAVITY TABLE POSITION[1]

Gravity table position	Total germination
	Percent
1	71.7
2	88.7
3	90.0
4	72.0
5	45.3

[1]Seeds from position six were included in the test but their germination averaged less than 1 percent; thus they were not included in this analysis. L.S.D. to compare position means at the 0.05 level is 6.8.

TABLE 5.—THE AVERAGE REAL GERMINATION IN PERCENT, AT 30 DAYS, OF GRAVITY TABLE SEED SEPARATES[1]

Gravity table position	Real germination
	Percent
1	71.9
2	88.9
3	92.8
4	93.1
5	94.4

[1]Real germination is based on the actual number of sound seeds contained in the samples.

TABLE 6.—CALCULATED AVERAGE GERMINATION VALUES BASED ON TOTAL GERMINATION OF SEPARATES BY GRAVITY TABLE POSITION[1]

Gravity table position	Germination values
1	8.27
2	12.19
3	13.76
4	8.17
5	2.92

[1]L.S.D. to compare position means at the 0.05 level is 5.40.

ate the data collected during the germination tests. Essentially this evaluation incorporates both the rate and total germination of the seed lot into a single numerical expression.

Results and Discussion

Elimination of empty or blind seed.—The data obtained on elimination of the empty or blind seed are reported in Table 1. These data clearly show the effectiveness of this process as a means of removing this undesirable portion of the seed lot. It is also noted that the sound seed values for four of the six separates exceed the 65.8 percent of the original seed lot. If desired, further refinement of the separation for the fourth and fifth positions could possibly be effected by again processing these seed separates.

The results of the weight-per-bushel determinations are shown in Figure 1. These differences are statistically highly significant. One of the major implications of these values is when they are combined with the seed values reported in Table 1. These data, reported in Table 2, show that by the elimination of seed collected at position six a reduction of approximately 11 and 18 percent, respectively, is effected in the weight and volume of seed requiring storage. Further, probably a wiser separation would also eliminate those seed from position five. This elimination would reduce weight and volume by an approximate total of 18 and 26 percent respectively. Such savings in the limited seed storage facilities at most nurseries would be welcomed. Also implied, but non-assessable, is the influence which these separate eliminations would have on the rates of sowing and the resulting stands.

An additional important feature is that this further processing is not lengthy or laborious, the entire 440 pound lot being processed in approximately one-half hour.

Influence on indices of seed quality.—These separations have further significance than elimination of empty or blind seed. An impor-

tant index of quality which is affected is the number of seed per pound (Table 3). With an increase in the percentage of empties and with a decrease in specific gravity the number of seed per pound increased by position in a significant or highly significant manner with the exception of from two to three.

The average total germination of the separates shows some additional interesting responses (Table 4). However, it is questionable whether these are properties of the seed separates or responses to pregermination treatment. From the general experience reported by Baldwin (*1*) more prompt germination would be expected from the heaviest seed. Evidence which indicates that the pregermination treatment might be the confounding factor is data based on the real germination of separates (Table 5). These differences, while not statistically significant, do show an increase in germination with a progression from separates one through five, suggesting that the separates from 3 and above benefited from the pregermination treatment while those below were harmed. Variation in the response of loblolly pine seed lots to pregermination treatment has been reported by Wakely (*5*) and Swofford (*4*). However, little light has been cast on the causes. The apparent variation of these separates indicates a possible explanation. Further investigation into this aspect is planned.

Further germination data presented in Figure 2 also show distinct differences in rates. Application of Czabator's technique of determining germination values to the data on total germination are reported in Table 6. These results show distinct differences in the amount and rate of germination between separates. However, again the possible variation in response to pregermination treatment prevents a clear interpretation.

Summary

Further processing by specific gravity separation, following dewinging and cleaning of a lot of loblolly pine seed, effected a significant elimination of empty or blind seed. This elimination has important implications in (1) the reduction of storage space required and the weight and volume of seed to be stored and (2) the rate and results of nursery sowings and direct seedings. The gravity separation of this seed lot also significantly influenced some of the indices of seed quality, namely (a) number of seed per pound, (b) weight of seed/unit volume, (c) viability, and (d) germination values, all of which are important in any regeneration methods involving the sowing of seed. This separation also provides leads for the possible explanation of the variation encountered with seed in response to pregermination treatment.

Literature Cited

1. BALDWIN, H. I. 1942. Forest tree seed of the North Temperate Regions with special reference to North America. 240 pp. Chronica Botanica Co. Waltham, Mass.
2. CZABATOR, F. J. 1958. A formula for evaluating germination tests. 19 pp. (Unpublished report on file at the Southern Forest Expt. Sta., U. S. Forest Service.)
3. GRAIN DIVISION, AGRICULTURAL MARKETING SERVICE. 1957. Grain grading primer. U. S. Dept. Agric. Misc. Pub. 740. 66 pp.
4. SWOFFORD, T. E. 1958. Stratification harmful to some loblolly and slash pine seed. Tree Planters Notes. No. 32, p. 5-6.
5. WAKELEY, P. C. 1954. Planting the southern pines. U. S. Dept. Agric., Agric. Monograph 18. 233 pp.
6. WELCH, G. B. 1954. Seed processing equipment. Miss. Agric. Expt. Sta. Bull. 520. 22 pp.

Furniss Appointed Journal Associate Editor

Robert L. Furniss, forest entomologist of the Pacific Northwest Forest and Range Experiment Station, U. S. Forest Service, Portland, Ore., has been named to the post of associate editor for entomology and pathology by President Garratt. He took over his duties in June.

Furniss succeeds Dr. Harvey J. MacAloney who has served in this capacity since October 1952. Dr. MacAloney asked to be relieved on the basis of length of tenure. The JOURNAL and the Society membership are indebted to him for his capable service of almost seven years' duration.

Furniss, widely recognized as a leading authority on Northwest insects and their control, was born in Oregon but reared in New York State. He graduated in 1930 from the State University College of Forestry at Syracuse University (N.Y.) with a major in forest entomology. He began his career with the Bureau of Entomology and Plant Quarantine in California, moving to the Portland Forest Insect Laboratory in 1936. In 1942 he was placed in charge of the laboratory. In 1953 the Bureau became part of the Forest Service.

Furniss is credited for major contributions in developing control techniques for spruce budworm and was a pioneer in the development of aerial surveys for determining insect damage. He helped organize the Western Forest Insect Work Conference, of which he is past chairman, and the Northwest Forest Pest Action Council. He is past president of the Oregon Entomological Society and past chairman of the SAF Columbia River Section. Once in 1949 and again in 1950 he was detailed to General MacArthur's staff in Japan where he worked on forest protection measures.

The Douglas-fir twig weevil was discovered by our new associate editor. It bears the name of *Cylindrocopturus furnissi*.

Altitudinal Races of Pinus ponderosa Confirmed[1]

R. Z. Callaham and Woodbridge Metcalf

MEASUREMENTS of 20-year-old pines grown in the North Coast Range of California confirm the hereditary differences in growth associated with elevation previously found in Sierra Plantations (*1, 2*). Ponderosa pines (*Pinus ponderosa* Laws.) and Jeffrey pines (*P. jeffreyi* Grev. and Balf.) from seed collected[2] at low elevations grew taller in 20 years than trees from high Sierra seed sources. As one would expect, the taller trees also were larger in diameter. When Jeffrey and ponderosa pines from the same elevation were compared, the Jeffrey pines exceeded the ponderosa in both height and diameter. Among pines grown in the Placerville nursery, however, at one and five years the ponderosas were taller than the Jeffreys from the same elevation. The formal statistical relationships between early growth and growth over 20 years were not computed, but graphical comparisons confirm that early growth can be used in predicting long-term growth rates (*1*).

THE AUTHORS are, respectively, geneticist, California Forest and Range Expt. Sta., Forest Service, U. S. Department of Agriculture, and associate professor emeritus, School of Forestry, University of California.

[1]The second in a series of papers presenting the results of long-term investigations into the variation in this species being conducted at the Institute of Forest Genetics, Placerville, Calif. The first paper in this series (*2*) showed the influence of elevation of seed source on subsequent growth.

[2]The seeds used in this study were part of the large assemblage collected under the direction of Lloyd Austin. Two other studies have utilized these seeds (*1, 2*).

The Study

These conclusions are the fruits of a long-term cooperative undertaking between the U. S. Forest Service, the University of California, and the California Division of Forestry. In 1937 Lloyd Austin sowed 12 lots of seed in the nursery of the Institute of Forest Genetics. Each lot represented a mixture of seed from several trees (Table 1) of ponderosa or Jeffrey pine. The trees were selected to give lots of seed representing elevational zones of 1,000 feet. The actual mean elevation for each lot differs somewhat from the zone midpoints: 500, 1,500, 2,500 feet, etc. The same number of seeds from each tree were used in making up the lot of seed for a particular zone.

TABLE 1.—THE NUMBER OF SEPARATE FIELD PLOTS IN EACH 1,000 FOOT ELEVATION ZONE ON WHICH SEED WAS COLLECTED FROM INDIVIDUAL TREES

Zone midpoint	Zone means	Field plots	Trees
	Pinus ponderosa		
Feet	*Feet*	*Number*	*Number*
500	544	23	23
1,500	1,500	15	15
2,500	2,429	27	30
3,500	3,491	11	30
4,500	4,443	13	15
5,500	5,538	12	15
6,500	6,354	11	15
	Pinus jeffreyi		
3,500	3,450	1	3
5,500	5,797	2	3
6,500	6,315	3	10
7,500	7,305	4	14
8,500	8,235	1	2

The 12 lots of seed were sown in a Latin square design in the nursery. Each seedling was measured at the end of the first and fifth seasons of growth and was scored for the development of a terminal bud at the close of the first growing season.

The North Coast planting site is a few miles south of Willits, California, on U. S. 101 at an elevation of 1,830 feet. The site had been donated to the University of California, School of Forestry, by Charles S. Howard. Woodbridge Metcalf suggested that this piece of land would make an admirable site for testing the Sierra seed sources in the Coast Range. In the spring of 1939, CCC crews under direction of the California Division of Forestry established a plantation of 2-year-old seedlings on the area.

The plantation was laid out in four blocks; one subsequently was destroyed. Each block contained 16 seedlings of each of the 12 elevational zones. These 16 seedlings were grouped in a 4 by 4 arrangement. A blank row was left between the groups of seedlings from each zone. Each group was randomly positioned in every block.

The trees survived the planting shock very well. After one year in the ground, 77 percent of the ponderosas and 68 percent of the Jeffreys survived. Elevation of seed source did not affect plantation survival. Low and high elevation progenies survived equally well. Each dead tree was replaced with a seedling from its own elevation in 1940.

All surviving trees were measured on May 30, 1956, the middle of the 20th growing season, by E. E. Gilden and the authors. The height of each tree was estimated

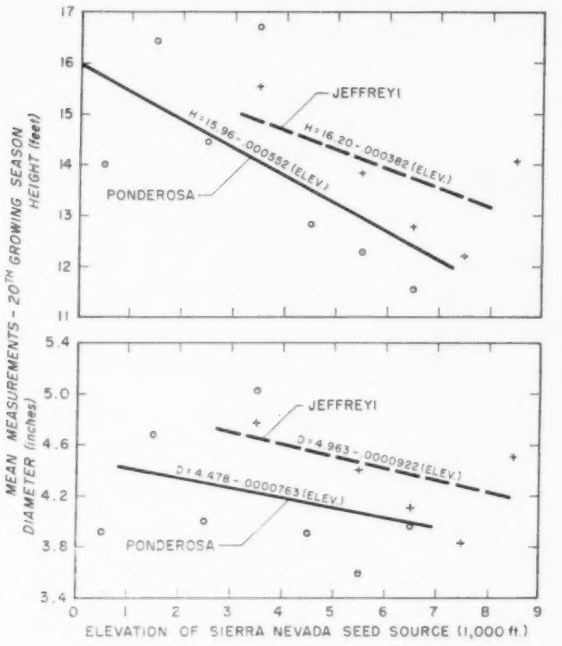


FIG. 1.—Heights and diameters during the twentieth growing season for pines grown at 1,800 feet in the North Coast Range.

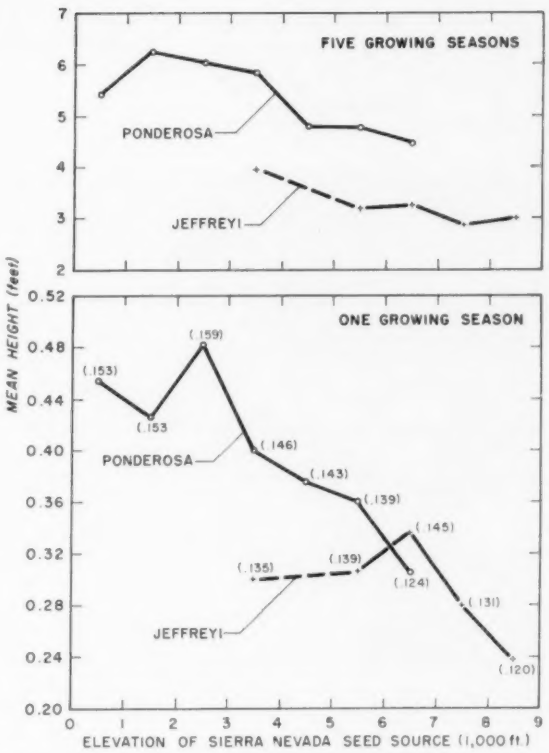


FIG. 2.—Heights after the first and fifth growing seasons for pines grown at 2,700 feet in the Sierra Nevada (Institute of Forest Genetics). (Ground line diameters in inches are shown in parentheses.)

to the nearest foot with a range rod, and the breast height diameter was measured to 0.1 inch with a steel tape. The relocation of the highway destroyed the plantation soon after this measurement.

Results

Statistical analyses of these data[3] showed the highly significant influence of elevation on the height and the diameter of both pines. The analysis of variance used in this study took into account the unequal number of survivors in each cell of the design (*3*). For each species the simple regressions of height and diameter on elevation were computed (Fig. 1). The ponderosa and Jeffrey regression lines were essentially parallel for height and diameter; the line for Jeffrey was higher in both cases. This means that 20-year-old Jeffrey pines in this Coast Range plantation grew larger than ponderosas from comparable elevations.

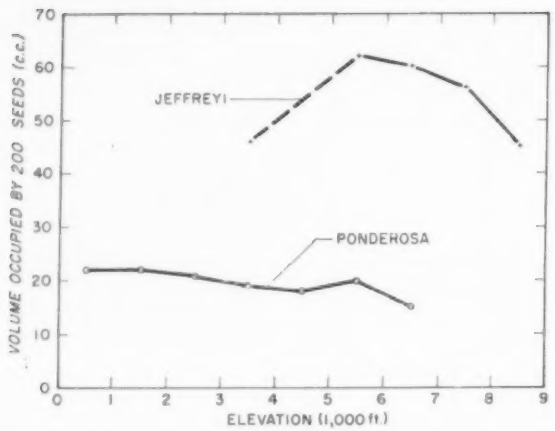
Height measurements of the seedlings in the Institute's nursery bed after the first and fifth seasons of growth contradicted this latter finding. At both times the ponderosa pines were larger than their Jeffrey pine neighbors; the heights and diameters showed the same elevational trend as at 20 years (Fig. 2). An analysis of variance of the first-year seedling heights showed these elevational differences to be highly significant. These early growth differences are heritable and cannot be solely attributed to associated differences in seed size (Fig. 3). The initial variations in seed size were not large enough to account for the very large variations in first year growth.

The ponderosas from all elevations showed little tendency to develop terminal buds, but the Jeffreys showed an overall greater tendency to bud development (Fig. 4). Each seedling was scored for bud development at the close of the first growing season. The scale ranged from 0 to 10; from no evidence of a terminal dormant bud, to typical dormant bud present. For Jeffrey pine the data suggested fewer buds at higher elevation; this difference is difficult to explain. One logically might expect higher elevation sources to exhibit a more pronounced dormant bud. The environmental conditions at the low elevation of this nursery planting may not have been suitable to stimulate bud formation on seedlings from the higher sources.

Discussion

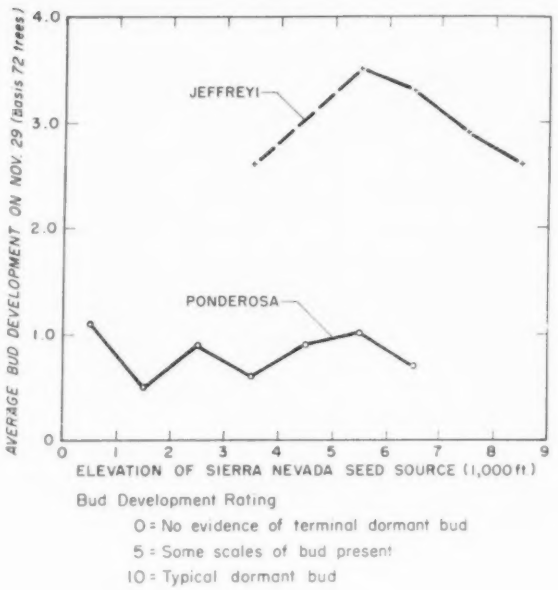
The performance of certain samples deserves further comment. For example, the ponderosa sample from lowest elevation performed poorly both in the Coast Range planting and in the Sierra Nevada nursery. Growth was significantly

[3]Statistical analyses of the plantation data were made by Simon Stiassney in consultation with Evelyn Fix, Statistical Laboratory, University of California.



ABOVE

FIG. 3.—Size of pine seed collected at different elevations in the Sierra Nevada.


AVERAGE BUD DEVELOPMENT ON NOV. 29 (Basis 72 trees)
JEFFREYI
PONDEROSA
ELEVATION OF SIERRA NEVADA SEED SOURCE (1,000 ft.)
Bud Development Rating
0 = No evidence of terminal dormant bud
5 = Some scales of bud present
10 = Typical dormant bud

RIGHT

FIG. 4.—Development of a terminal bud at the close of the first growing season on pines grown at 2,700 feet from seeds collected in the Sierra Nevada.

less than for middle-elevation ponderosa progenies. Incidentally, many of the low elevation seed trees from which the seeds for this sample were obtained were isolated individuals. Self-pollination would be likely in such cases. Other progeny tests of these same seed trees have shown this depression of growth (*1, 2*).

A word should be added here about the anomalous Jeffrey pine from 3,500 feet. The stand from which this seed was collected is located well below the normal distribution of Jeffrey pine. The trees grow on an island of serpentine soil in the midst of a mixed conifer forest where ponderosa pine predominates. Of the 10 natural hybrids found among all of the seedlings in the nursery, six were from this low-elevation Jeffrey stand. The possibility exists of past and present introgression of ponderosa genes into this Jeffrey pine. This introgression might account for the unusually small seeds exhibited by this low-elevation Jeffrey, for the less frequent development of a terminal bud, and for the rapid growth rate of the progenies.

In addition to these six natural hybrids, three more were found among the Jeffrey seedlings from 5,500 feet. This elevation represents the tension zone where these two species occur thoroughly mixed. No natural hybrids were found in any of the ponderosa progenies. Perhaps the sequence of flowering of the two species prevents the natural occurrence of reciprocal hybrids.

The Jeffrey pine samples from the highest elevation performed in an extraordinary and inexplicable manner. The female parents were two trees growing at 8,235 feet, east of the summit of Kit Carson Pass. This sample performed poorly up to five years in the nursery, as expected. But in the Coast Range this sample exceeded all but the lowest elevation Jeffrey and ponderosa pines. This reversal represents a most interesting genotype-environment interaction.

Conclusion

All in all, the results of this small test confirm earlier reports of the performance of the same seed lots in the Sierra Nevada. Trees from high elevations, with one notable exception, tended to grow more slowly than trees from low elevations. The larger-seeded Jeffrey pines tended to grow slower at first than the smaller-seeded ponderosa pines. Ponderosa pines regardless of the elevation from whence they came did not produce a typical dormant resting bud at the end of the first growing season. On the other hand, Jeffrey pines showed a greater propensity to bud development.

Literature Cited

1. CALLAHAM, R. Z. and A. A. HASEL. 1958. Height growth of ponderosa pine progenies. Soc. Amer. Foresters Meeting, Proc., 1957, pp. 61-62, illus.

2. MIROV, N. T., J. W. DUFFIELD, and A. R. LIDDICOET. 1952. Altitudinal races of *Pinus ponderosa*—a 12 year progress report. Jour. Forestry 50: 825-831, illus.

3. SCHEFFÉ, H. 1956. Lectures on the analysis of variance. Associated Students' Store, University of California, Berkeley. 246 pp., illus.

Comparison of Dry and Chemical Girdling to Prevent Sporulation of the Oak Wilt Fungus[1]

J. H. Ohman, N. A. Anderson, and D. W. French

LONG DISTANCE SPREAD of oak wilt occurs when spores of *Ceratocystis fagacearum* (Bretz) Hunt. are carried from tree to tree by insects, particularly those in the family Nitidulidae, but also by other insects and squirrels (*3, 5, 6, 8, 10, 11*). Overland transmission is more likely to occur in the spring (*7, 9, 10*) during the period of springwood formation by the host (*11*). Conidia and ascospores are produced on mycelial mats formed beneath the bark in the cambial zone of recently wilted red or black oaks. Members of the white oak group, while susceptible to the disease, rarely bear mats.

In Minnesota only trees which wilt in July or August are considered dangerous from the standpoint of bearing mats during the spring when transmission is most likely to occur. Mat production ceases in the fall of the same season on trees which wilt in June while trees which wilt in September do not bear mats until late July or August of the following year (*1*).

In view of the difficulty of controlling the vectors, chemical girdling and dry girdling of wilting trees were investigated as means of reducing or preventing sporulation of the fungus to control long distance spread of the disease. The effectiveness of dry girdling in West Virginia has been reported (*4*).

FIG. 1.—Completed dry girdle. The small hole below the girdle was used to introduce the inoculum.

Materials and Methods

The dry girdling treatment consisted of removing all sapwood in a one-inch ring immediately above the ground line using a "Beaver Girdler."[2] A completed girdle is shown in Figure 1.

Chemical girdling consisted of removing a six-inch cylinder of bark from the tree to be treated by first making upper and lower cuts through the bark completely around the bole and then pounding

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[1]Paper No. 4065, Scientific Journal Series, Minnesota Agricultural Experiment Station.

Work supported in part by Regional Research Funds provided by Project NC-22.

[2]Manufactured by the Haynes Manufacturing Co., Livingston, Texas.

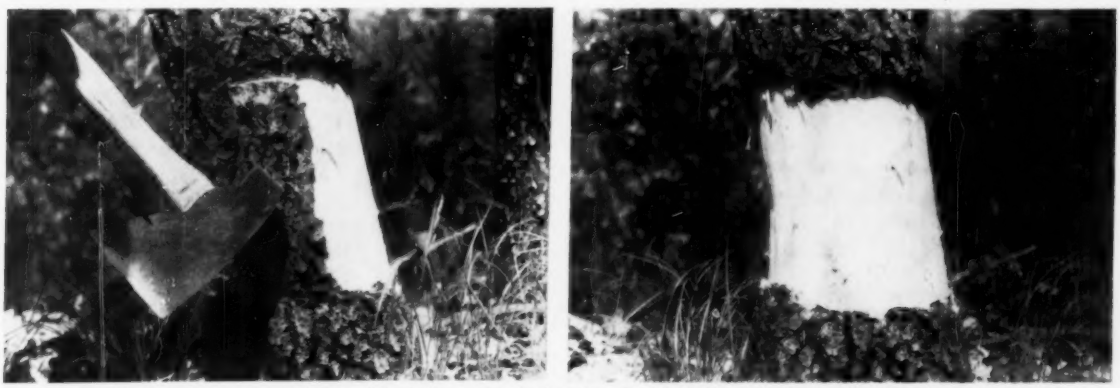

FIG. 2.—*Left*, removing the cylinder of bark for a chemical girdle. *Right*, girdle ready for application of sodium arsenite.

the bark with the flat edge of a hand ax (Fig. 2). The cylinder removed was located as near as possible to the ground line. The chemical was then painted liberally on the exposed sapwood.

Two formulations of sodium arsenite were used with the chemical girdle. The first, Atlas "A" Debarking Compound, a commercial preparation containing approximately 40 percent sodium arsenite, was mixed 1:1 with a 10 percent aqueous solution of sodium pentachlorophenate, and used in the 1955 and 1956 tests. The second formulation, used in the 1957 tests, was made by mixing eight pounds of dry arsenic trioxide (As_2O_3) with two pounds of dry sodium hydroxide (NaOH) then adding three quarts of water slowly with continuous stirring. Any compound containing sodium arsenite is very toxic to animals and precautions should be taken when using it.

TABLE 1.—AVERAGE NUMBER OF MATS PRODUCED PER TREE ON WILTING RED OAKS WHICH WERE DRY GIRDLED

Month treated	Year	Total number of trees		Average number of mats per tree	
		Treated	Check	Treated	Check
June	1956	15	39	1.9	7.9
July	1955	10	5	0.5	4.6
July	1957	21	22	5.3	15.1
August	1955	37	16	1.1	2.8
August	1957	20	22	1.4	8.8

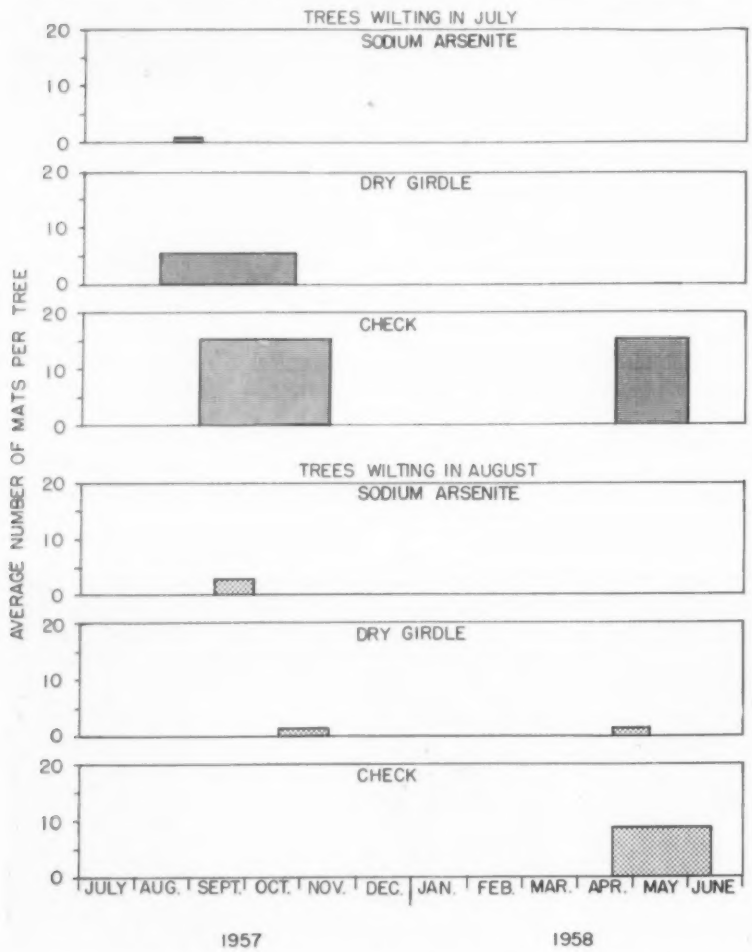

FIG. 3.—Duration of new mat production and average number of mats formed per tree on trees which wilted in July or August of 1957.

Trees treated in each test were inoculated with a conidial suspension of isolate 907a of *C. fagacearum* (an "A" strain of the fungus collected in Minnesota). The trees were in a pure even-aged stand, approximately 50 years old, located on the Carlos Avery Game Refuge[3] near Wyoming, Minnesota. They ranged from 3 to 15 inches d.b.h. and averaged approximately 8 inches d.b.h. The trees were girdled when the inoculated trees showed incipient wilt involving at least 10 percent of the crown. In most cases this was about five weeks after inoculation.

Beginning one month after treatment, each tree was examined weekly for mats. These examinations were continued for at least two weeks after the cambial zone appeared dry and had lost the odor characteristic of infected trees in the mat producing stage. In the 1957 experiments the final examination was made by climbing each tree. Areas where the bark seemed loose as well as where there were obvious cracks were opened and examined. These weekly examinations were discontinued from mid November until early April of the following year since no new mats are known to be produced during these months in Minnesota. Mat production, on both treated and nontreated trees which had wilted in July or August of the previous year, had ceased by July 1 and the experiments were concluded at that time. In the 1956 experiment, made on trees which wilted in early June, mat production ceased by mid November of the same year, but the trees were examined the following spring.

Mats produced on trees chemically girdled with sodium arsenite were considerably smaller than those on the check trees. During the 1957 experiments 13 mats on five trees treated with sodium arsenite

[3]Acknowledgment is made to the Minnesota Department of Conservation for use of areas in the Carlos Avery Game Refuge.

and 48 mats on five check trees were measured. The approximate area of the mats was determined by multiplying the length by the width of each mat. The area so obtained is not necessarily an accurate measure of mat size, as most mats are elliptical in shape, but it does give a reasonable value for purposes of comparison.

Trees on which mats form in the spring of the year have a sapwood moisture content of approximately 40 percent (wet weight basis) or higher (*2*). During May and June 1956 the moisture contents of five trees dry girdled and two trees chemically girdled were determined. The trees wilted and had been girdled in August of 1955. The trees were felled, and two samples of sapwood and adjacent heartwood were taken from two-inch discs. The samples were placed in tared cans in the field, weighed on arrival at the laboratory, and then dried to a constant weight at 105°C.

Three other chemicals, a 2,4-D 2,4,5-T mixture (1.6 ounces of the butoxy ethanol ester of 2,4-dichlorophenoxyacetic acid plus 1.6 ounces of the butoxy ethanol ester of 2,4,5-trichlorophenoxyacetic acid per gallon of number 2 fuel oil) and 2,4-D (32 ounces of the alkanolamine salt of 2,4-dichlorophenoxyacetic acid per gallon of solution) and a mixture of two pounds of copper sulfate and two pounds of chromated zinc chloride in one gallon of water were also tested with the chemical girdle. These chemicals in some cases reduced the length of time during which new mats were produced as compared to nontreated trees, but did not reduce the total number of mats produced or eliminate spring mat formation.

Results

Mat production on dry girdled trees is summarized in Table 1. Duration of new mat formation for the 1957 tests is shown in Figure 3. Dry girdling was effective in reducing the number of mats formed and also prevented mat production during the following spring when trees were treated before July 15. On trees treated in August dry girdling did not prevent mat production during the following spring. The time during which new mats were formed was reduced and the first mats developed sooner than on wilting trees which were not girdled.

TABLE 2.—AVERAGE NUMBER OF MATS PRODUCED PER TREE ON WILTING RED OAKS GIRDLED AND TREATED WITH SODIUM ARSENITE

Month treated	Year	Total number of trees		Average number of mats per tree	
		Treated	Check	Treated	Check
June	1956	10	39	0.1	7.9
July	1957	22	22	0.9	15.1
August	1955	24	15	1.6	2.3
August	1957	21	22	3.1	8.8

TABLE 3.—COMPARISON OF MYCELIAL MAT SIZE ON RED OAKS CHEMICALLY GIRDLED WITH SODIUM ARSENITE AND NONTREATED TREES

Treatment	Mats Total	Trees Total	Av. length	Av. width	Average approximate area
	No.	*No.*	*Cm.*	*Cm.*	*Sq. cm.*
Sodium arsenite	13	5	4.6	1.8	8.3
Check	48	5	7.9	4.1	34.0

Range:
Approximate area
Sodium arsenite 3.5- 12.9 sq. cm.
Check 11.0-112.3 sq. cm.

Mat production on trees chemically girdled with sodium arsenite is summarized in Table 2, and the duration of new mat formation is shown in Figure 3. This treatment was the most effective in that the number of mats produced was much less and no mats were produced the following spring regardless of time of treatment. The period during which new mats were produced was greatly reduced in comparison with the nontreated checks as illustrated in Figure 3.

Mats produced on the nongirdled trees were approximately four times larger in area than those produced on trees chemically girdled with sodium arsenite. The checks averaged 34.0 sq. cm. in approximate area and those on the treated trees averaged 8.3 sq. cm. (Table 3).

In addition to being much smaller than normal some of the mats produced on trees treated with sodium arsenite did not fully crack the bark of the host. Such mats were detected by "sounding" with a hand ax or by the fact that a few cracked the outer bark but not the inner bark and thus could be detected by more careful examination. Mats of this type are probably not important as a source of inoculum since insect vectors such as the Nitidulids would have difficulty gaining entrance to the mats.

The great majority of the mats produced on trees treated with sodium arsenite during the 1957 tests were more than 20 feet above the ground. On trees treated in July, 10 percent were found at less than 20 feet and on trees treated in August, 14 percent were at less than 20 feet. This was in contrast to the nontreated trees which had about half (54 and 50 percent respectively) of their mats at less than 20 feet.

In both the dry girdle and the chemical girdle with sodium arsenite, the sapwood moisture content above the treated surface was less than 30 percent. The low sapwood moisture content resulting from the two treatment methods may explain the absence of mats on the girdled trees in the spring of 1956 and on those treated trees which did not bear mats in the spring of 1958.

Discussion

The chemical girdle using sodium arsenite appears to be the most effective method of reducing mat production and may be one method

of limiting overland spread of the fungus. The effect of this treatment on mat production is threefold. The number of mats produced is greatly reduced. The mats formed are much smaller in size and many are unable to effect the complete crack in the bark necessary for some vectors to reach the fungus. Mat production is eliminated during the spring of the year when overland transmission is most likely to occur. With respect to the number of mats produced the treatment is more effective when applied to trees wilting early in the summer. This probably is related to greater upward movement of water and nutrients early in the season, allowing better translocation of the chemical. Even though the total number of mats on trees which wilted and were treated in August was greater than on trees treated earlier in the season, none were formed the following spring. The fact that the great majority of the mats produced on these trees were above 20 feet and reduced in size suggests the possibility of an insufficient amount of chemical moving to the upper crown so that inhibition rather than prevention occurred. Perhaps if more chemical could be introduced into the tree, the treatment would be even more effective.

Very few mats were formed on trees which wilted and were dry girdled in August, but the fact that most of these were formed the following spring eliminates dry girdling as an effective treatment, at least for trees wilting in August. The difference in effectiveness of the treatment when applied at different periods probably is due to the moisture relations important in mat formation. The moisture content of the sapwood is significantly higher in healthy red oaks in the "growing condition" (June 15 to July 20) than in the "resting condition" (July 29 to leaf fall) and the sapwood moisture content of wilting trees remains for some time at a level near that prevailing in July (*2*). Thus a wilting tree dry girdled in July would have a higher moisture content above the girdle than a similar tree girdled in August. However, 15 percent of the August wilting trees that were dry girdled did produce mats the following spring. This cannot be explained on the basis of incomplete or too shallow girdling since another check was made on the trees which produced mats the following spring and all were found to have been completely girdled.

A combination of the two most effective treatments—dry girdling and chemical girdling with sodium arsenite—might prove a highly effective control. Investigations are being conducted at present to determine this.

Summary

Tests involving nearly 300 trees were made over a three year period to compare the effectiveness of chemical girdling with sodium arsenite and dry girdling in the prevention of mycelial mat formation by the oak wilt fungus on inoculated red oaks.

The nontreated check trees in each experiment produced more mats over a longer period than the treated trees and in the case of trees which wilted in July and August produced most of their mats during the spring following inoculation.

The chemical girdle using sodium arsenite was superior to other treatments. Spring mat production was eliminated, the average number of mats per tree was much less, the duration of new mat production was much shorter, and mat size was smaller than on the nontreated trees.

Dry girdling of trees that wilted in July prevented mats from forming on these trees the following spring. Mats did form, however, on some of the trees that were dry girdled in August. The average number of mats per tree and the duration of new mat production was shorter than on the nontreated checks.

Literature Cited

1. ANDERSON, N. A. 1957. Studies on the epidemiology and control of the oak wilt fungus, Endoconidiophora fagacearum Bretz. M.S. Thesis, Univ. of Minnesota (unpublished).
2. CAMPBELL, R. N., and DAVID W. FRENCH. 1955. Moisture content of oaks and mat formation by the oak wilt fungus. For. Sci. 1:265-270.
3. DORSEY, C. K., F. F. JEWELL, J. G. LEACH, and R. P. TRUE. 1953. Experimental transmission of oak wilt by four species of Nitidulidae. Pl. Dis. Reptr. 37:104-109.
4. GILLESPIE, W. H., A. L. SHIGO, and R. P. TRUE. 1957. The degree of mat-production control obtained by girdling oak wilt trees in West Virginia and some factors influencing mat production in girdled trees. Pl. Dis. Reptr. 41:362-367.
5. GRISWOLD, C. L. 1953. Transmission of the oak wilt fungus by the pomace fly. Jour. Econ. Entom. 46:1099-1100.
6. HIMELICK, E. B., E. A. CURL, and B. M. ZUCKERMAN. 1954. Tests on insect transmission of oak wilt in Illinois. Pl. Dis. Reptr. 38:588-590.
7. JEFFERY, A. R. 1953. The relation of oak wounds made during springwood formation to transmission of oak wilt. Pl. Dis. Reptr. 37:568.
8. JEWELL, FREDERICK F. 1956. Insect transmission of oak wilt. Phytopathology 46:244-257.
9. MCMULLEN, L. H., C. R. DRAKE, R. D. SHENEFELT, and J. E. KUNTZ. 1955. Long distance transmission of oak wilt in Wisconsin. Pl. Dis. Reptr. 39:51-53.
10. NORRIS, D. M., JR. 1955. Natural spread of Endoconidiophora fagacearum to wounded red oaks in Iowa. Pl. Dis. Reptr. 39:249-253.
11. ————. 1956. Association of insects with the oak tree and Endoconidiophora fagacearum Bretz. Ph.D. Thesis, Iowa State College.

Notes and Observations

A Rapid Method of Establishing Permanent Sample Plots

The time required to establish and maintain small, permanent sample plots can be reduced by a device that facilitates mapping or recording the location of plants within the plots. The device consists simply of a disk of plywood or similar material with its surface divided into 36 ten-degree sectors numbered clockwise. In use, it is placed on the ground at plot center with the line between sectors 1 and 36 pointing north. The location of a given plant within a plot is then established by measuring the distance from the circumference of the disk and noting the number of the sector in which it lies.

A 3-inch hole in the center of the disk permits it to be slipped over a 2x2 inch stake located at plot center. The disk is held in place by a wire pin slipped through a hole in the disk and into the ground. The pin holds the disk stationary while measurements are taken on plants within the plot. For measuring distances, a tape is connected to the end of a piece of wire. The other end of the wire is looped, slipped over the stake, and rests on the disk so that the zero mark on the tape corresponds to the outer edge of the disk (Fig. 1). As the tape is rotated around the stake, the sector and distance of a plant can be read directly from the disk and tape.

The plot formed by using this method is a ring or annulus because the area under the disk is not included in the plot. It was found that using a disk 1.62 feet in diameter would result in a 1-milacre annulus with a width of exactly 3 feet —an easy number to work with. Moreover, a disk of this size is large enough for easy reading of the sectors yet small enough to carry conveniently. The plot size can be changed by varying the distance

FIG. 1.—The disk ready for use.

TABLE 1.—WIDTH OF ANNULI FOR DIFFERENT SIZE MILACRE PLOTS FOR A DISK 1.62 FEET IN DIAMETER

Plot size	Width of annulus
Milacres	*Feet*
1	3.0
2	4.5
3	5.7
4	6.7
5	7.6

read on the tape (Table 1).

This method, like other types of circular plots,[1] is simple and convenient to use and requires only one stake. In addition, use of the disk reduces the time of relocating seedlings. In Illinois the disk has been used in establishing and resurveying permanent plots for observing the establishment, growth, and mortality of natural regeneration. And, since the area adjacent to the stake is excluded from the annular plot, there is little chance of chemically treated stakes affecting measured seedlings.

For random sampling within circular plots the disk facilitates the location of angular coordinants.[2] It is not necessary to reset and sight through a staff compass since the sectors can be read directly from the disk.

The disk method can be used in combination with larger circular plots similar to those described by Stott and Ryan.[3] Circular tally sheets, designed for these larger plots, can also be used with the disk.

Speed, simplicity, and accuracy make this a convenient method for establishing permanent plots, for sampling understory vegetation, or for establishing experimental plantings with polar coordinants.

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[1]Division of Silvics, Branch of Research, Forest Service. Sample plots in silvicultural research. U. S. Dept. of Agric. Circular No. 333, 90 pp., illus. 1935.

[2]Gaiser, R. N. Random sampling within circular plots by means of polar coordinants. Jour. Forestry 49:916-917, illus. 1951.

[3]Stott, C. B. and E. J. Ryan. A permanent sample plot technique adapted to commercial timber stands. Jour. Forestry 37:347-349, illus. 1939.

National Forests and Parks Established in Colombia

One of the early actions taken rather recently by the new representative government in Colombia was enactment of a law establishing an extensive national forest (watershed and soil protection) system. It provides also for national parks. The area involved is close to 50 percent of the total area of the country.

That is probably a new high in the world in percentage of total area of a country devoted to such public purposes. However to be considered in that connection are such important points as the following: Colombia is extremely mountainous. Three towering cordilleras of the Andes occupy most of its western half. Exploitation

of the timber, range and soil in this heavily populated zone has been excessive for several hundred years. As a result serious floods, erosion and other damage to the watershed are commonplace. The eastern half of the country is still quite inaccessible and uninhabited. Great areas here in the headwaters of the Orinoco and Amazon are occupied by marshy, unhealthful, tropical forests. Largely because of that combination of difficulties not much more than two and a half percent of the country is under cultivation.

The new law places the administration of the public forest and watershed protection areas, including privately owned lands within these units, under the supervision of the Minister of Agriculture. It authorizes and directs him with regard to these areas: (a) to have appropriate sites classified for agricultural use and occupancy; (b) to issue and enforce regulations needed to obtain the best possible use of the land and resources including satisfactory "forest exploitation"; (c) to establish national parks, botanical gardens and biological reserves; (d) to manage the wildlife resources; (e) to take other specified actions as needed; and (f) to employ the personnel needed to meet these responsibilities—to the extent that appropriations are made available for such purposes.

It is understood that the new law was initiated by Minister of Agriculture, Dr. Jorge Mejia S., a University of California graduate who is well acquainted with U. S. foresters and with the national forests in the Sierras of that state. Representatives in Colombia of other countries which have large areas of public forests were also called on by the minister for advice, including Ambassador Ford of Canada, and the Swedish Embassy.

Dr. Mejia also initiated legislation calling for extensive but moderate other changes in land use in Colombia, including inducements to convert to more intensive agriculture many large areas of land now being used only as low-caloryyielding pastures by absentee owners and others.

Enactment of this law seems to provide an indispensable base for a system of well administered national forests and parks. However, continuing advice from foresters of other countries which have gone through a similar experience, plus mainly a tremendous effort by Colombian foresters, will no doubt now be needed to place these areas actually under effective administration. It will be a most challenging task for them.

EARL W. LOVERIDGE

Editor's note.—Mr. Loveridge's obituary appears on page 529.

Soil-Moisture Depletion Rate in Puerto Rico Less Than in Drier Climates[1]

In a recent study in Puerto Rico, soil-moisture depletion rates were found to be about one-half those in the United States for similar sites (*4*).

In temperate latitudes, the drying rate of soil varies with the seasons. Winter rates are usually low. Summer rates are highest, and spring and autumn rates about one-half the summer rate. The yearlong rate in Puerto Rico was about equal to the spring-fall rate in the United States.

The duration of "summer" depletion rates at all latitudes corresponds roughly to the length of the growing season. In interior Alaska, near Fairbanks, summer rates of drying apply from June through August (*3*). In northern Wisconsin, they generally last from late May to late September. In Mississippi, the summer rate is applicable from May 10 to October 15, on the average. The trend continues down into the tropical climate of Puerto Rico, where the growing season and soil-moisture depletion are almost uniform the year around.

The procedures used were similar to those of previous soil-moisture studies in the United States, including Alaska. Soil-moisture determinations on six sites were made daily from September 1955 to June 1956. The moisture content of the upper two feet of soil was measured daily at depths of 1.5, 4.5, 7.5, 15, and 21 inches with

TABLE 1.—YEARLONG RATE OF MOISTURE LOSS IN PUERTO RICO AS COMPARED WITH SEASONAL RATES IN DRIER CLIMATES

Location	Sites	Average daily moisture loss, 0- to 12-inch depth		
		Summer	Spring-fall	Winter
	No.	*Inches*		
Puerto Rico	6	0.06	0.06	0.06
Vicksburg, Miss.	7	.11	.07	.04
Oxford, Miss.	3	.11	.08	.05
Alexandria, La.	2	.13	.08	.05
Nacogdoches, Texas	3	.10	.07	.05
Crossett, Ark.	5	.10	.04	.02
Poplar Bluff, Mo., and Grantsburg, Ill.	2	.12	.06	.04
Rhinelander, Wis.	7	.10	.05	.04
Priest River, Idaho	4	.11	.06	No data
Fairbanks, Alaska	2	.10	.07	No data
Average of all sites, excluding Puerto Rico		.11	.06	.04

[1] A report of a cooperative study by the Southern Forest Expt. Sta., Forest Service, U. S. Dept. Agric., and the Waterways Expt. Sta. (Vicksburg, Mississippi), Corps of Engineers, U. S. Army.

TABLE 2.—CUMULATIVE MOISTURE LOSS FROM 0- TO 12-INCH LAYER OF SELECTED SITES IN PUERTO RICO AND CENTRAL MISSISSIPPI

Day	Vicksburg, Miss.		Puerto Rico	
	Commerce Silty Clay	Collins Silt Loam	Rio Piedras Clay	Coloso Silt Loam
	Inches	*Inches*	*Inches*	*Inches*
1	0.24	0.18	0.05	0.01
3	.60	.46	.17	.05
5	.96	.76	.31	.22
10	1.59	1.47	.75	.80
15	2.05	2.28	1.02	1.18
20	2.31	2.80	1.22	1.37
25	2.50	3.02	1.30	1.43

fiberglas units (*1, 2*).

The average yearlong soil-moisture loss for the six sites in Puerto Rico was 0.06 inch per day. The variation between sites was 0.05 to 0.08 inch. As Table 1 indicates, the average rate is approximately one-half the daily summer loss recorded for 9 areas between central Mississippi and Fairbanks, Alaska. The averages in the table are of the rate for the first 25 days after field-maximum moisture content was reached.

The comparatively slow depletion rate for the Puerto Rico sites was maintained throughout the drying period. This may be illustrated by data from two sites in Puerto Rico and two near Vicksburg, Mississippi (Table 2).

The Coloso and Collins silt loams are both bottom-land soils and both were under grass. The Commerce silty clay is also a bottom-land soil and was covered with pasture grasses. The Rio Piedras clay site, also in a pasture, was on a slope of 8 percent, and thus in a better position to drain than any of the others.

The Commerce silty clay and the Collins silt loam in Mississippi each dried to the wilting point within the 25-day period, while the Rio Piedras clay and the Coloso silt loam in Puerto Rico each lost little more than half their available water in the same length of time.

These observations appear to verify those of Wilm (*5*), who states that, ". . . It is often considered that evapo-transpiration opportunity increases directly with annual precipitation. This may be generally true when total annual precipitation does not greatly exceed potential evapo-transpiration. But in humid areas with excessive precipitation, it seems logical that evapo-transpiration opportunity may actually decrease with further increases in precipitation. This seems to be illustrated by precipitation-runoff relations in the Luquillo Mountains of Puerto Rico, where precipitation is around 200 inches . . . and approximate runoff data indicate total evapo-transpiration losses around 20 inches . . . or less." Since the rainfall at the study sites in Puerto Rico totaled about 75 inches from September 1955 to June 1956, these sites may well fall into the "excessive" rainfall category.

Literature Cited

1. COLMAN, E. A. 1947 (rev. 1950). Manual of instructions for use of the fiberglas soil-moisture instrument. U. S. Forest Serv., Calif. Forest and Range Expt. Sta., 20 pp.
2. REINHART, K. G. 1953. Installation and field calibration of fiberglas soil-moisture units. U. S. Forest Serv., South. Forest Expt. Sta. Occas. Paper 128, pp. 40-48.
3. TOBIASKI, R. A., and D. E. LARSON. 1955. The development of methods for predicting soil-moisture content. Report on the Fairbanks, Alaska, Extension. U. S. Corps of Engineers, Waterways Expt. Sta., Misc. Paper 4-135, 68 pp. plus appendices.
4. U. S. FOREST SERVICE and U. S. ARMY ENGINEERS WATERWAYS EXPERIMENT STATION. 1957. Information for predicting moisture in the surface foot of various soils. Forecasting Trafficability of Soils, Report No. 4. Technical Memorandum 3-331, 26 pp. plus appendices.
5. WILM, H. G. 1957. The influence of forest vegetation on water and soil. Unasylva 11: 160-164.

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Growth Response of Rooted Cuttings of Pine and Spruce[1]

In the paper, "Effects Of Stock Plant Fertilization On Rooting Response of *Picea abies, Pinus resinosa* and *Pinus strobus*," in the May 1959 issue of the JOURNAL OF FORESTRY it was reported that cuttings taken from these trees were rooted with comparative ease under the conditions of the experiment. The cuttings rooted in that experiment were planted in a nursery row in a sandy loam soil a few hours after they were removed from the propagating greenhouse. They were shaded for approximately four weeks after they were planted and were then allowed to grow on without any other special care. Since a great deal of interest has been expressed in the results of the experiment the following information describing the growth and development of these plants is presented.

An average 2-0 seedling of red pine is 8 to 10 inches tall and has a stem thickness of one quarter inch or less. The foliage is fairly dense and the root system is comprised of 2 or 3 fine major roots from which develop several laterals of even more delicate texture and structure. In Figure 1 it can be seen that a 1 year old rooted cutting has attained the same height as an average 2-0 seedling, and in addition, the stem diameter is twice that of the seedling stem diameter. The roots, while admittedly only an inch or two longer than those of the seedling, are heavier, and therefore, more suited for transplanting.

An average Norway spruce seedling (2-0) is 7 to 9 inches tall and has extremely short lateral branches. The root system (Fig. 2) is delicate and sparse. The 1 year old rooted cutting developed to a height one and a half to two times that of the seedling; had longer

[1]Miscellaneous Pub. No. 337, Contribution No. 2967 of the Maryland Agric. Expt. Sta. (Department of Horticulture).

FIG. 1.—One-year rooted cutting (right) of red pine and 2-0 seedling (left).

FIG. 2.—One-year rooted cutting (right) of Norway spruce and 2-0 seedling (left).

lateral branches which gave it the typical pyramidal form of an older spruce; and developed a very dense root system which was almost as long as the entire seedling that was twice the age of the cutting.

White pine responded in a similar manner. A typical 2-0 seedling is 4 to 6 inches long, has a few needles densely arranged at the upper extremity of the stem, no side branching and only a few fine roots. The 1 year old cuttings grew to approximately double that size. They are heavier in stem, foliage and root structure.

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Egg Sampling Reveals Trend In White-Fir Sawfly Abundance

Foresters and entomologists are both interested in ways of predicting the population trend of an insect. Such information would enable them to plan in advance for precautionary measures to forestall excessive damage to forests. Recent studies of the white-fir sawfly, (*Neodiprion abietis* [Harr.] [complex], have revealed a method that shows considerable promise for predicting changes in its abundance.

The white-fir sawfly is a defoliator belonging to the order Hymenoptera. Its eggs are laid from late October to early November, in slits cut by adult females along the edges of true fir needles (*Abies concolor* [Gord. & Glend.] Lindl. and *A. magnifica* A. Murr.). The eggs overwinter, then hatch in June. The larvae feed gregariously in June and July on previous years' foliage, destroying the needles. At maturity in late July the larvae migrate to the duff, spin cocoons, then remain in aestivation until they pupate and change to adults in the fall.

These facts were determined as a result of detailed biological studies[1] begun in 1953 to investigate recent white-fir sawfly outbreaks.

As a part of this biological research a sampling technique using the egg stage was developed to keep track of population trends. This technique provides a convenient means of estimating the potential damage by larvae.

The Study

Two infested areas separated by 200 airline miles were used in this study: Howland Flat, Plumas National Forest, and Crane Flat, Yosemite National Park. Egg sampling was begun at Howland Flat in 1953, and at Crane Flat in 1954. The sampling was continued annually through 1957 in both areas.

TABLE 1.—EGG CLUTCHES IN SAMPLES OF 200 TWIGS EACH YEAR AT HOWLAND FLAT

Year	Number of clutches		Observed damage
	Mean	*S.E.*	
1953	125	±7.0	Conspicuous
1954	37	±5.5	Visible
1955	32	±5.0	Barely visible
1956	9	±2.9	Indiscernible

Eggs occur in easily identified clutches. A clutch consists of all the eggs deposited by a single female adult sawfly in the needles of one or more adjacent shoots of a given twig. The mean number of eggs per clutch was determined at 50.38 ± 2.55. The viability of eggs is high, nearly every egg of a clutch hatching. The larvae therefrom become established into gregarious feeding colonies.

The study areas were subdivided into four units. In each unit two twigs were clipped from each of 25 trees at random. Twigs were clipped at arm's reach from the ground. They measured about 6 inches long and contained about 15 laterals. Collected twigs were kept inside individually labelled polyethylene bags under refrigeration until the eggs were counted and recorded separately by clutches. The samples were taken between May 15 and June 1 each year, well ahead of hatching.

The populations of eggs each year were closely related to the amount of subsequent damage by larvae to the foliage. In 1953, when the mean number of egg clutches at Howland Flat was 125 in 200 twigs, the damage was conspicuous (Table 1). In 1956, when the number of clutches found had dropped to nine, no damage was discernible.

[1]Struble, George R. Biology and control of the white-fir sawfly. Forest Sci. 3(4): 306-313. Illus. 1957.

The sampling for each year revealed a sharp downward decline.

The same downward trend was shown by the Crane Flat infestations (Fig. 1). No record was taken of the populations at Crane Flat in 1953, but in 1954 the numbers found there were at a somewhat higher level than at Howland Flat. From 1954 on, both areas revealed sharp reductions each subsequent year, with the lowest populations in 1957. The Plumas record showed a reduction of 99.8 percent of the 1953 level there; at Yosemite the reduction amounted to 97 percent of the 1954 level.

The sudden population decline in both areas resulted from a native polyhedrosis epizootic among maturing larvae. The onset of this virus infection was very sudden in both the Howland Flat and Crane Flat outbreaks in 1953. Although the sawfly population was not recorded at Crane Flat in 1953, observational evidence hinted at a level approaching that at Howland Flat. Very likely, the subsequent

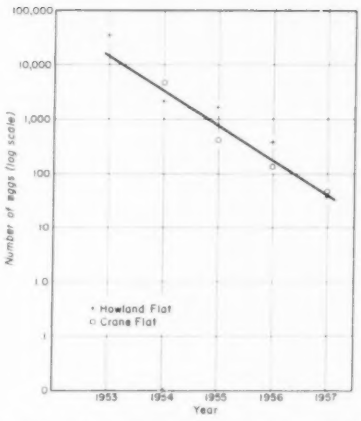

FIG. 1.—Number of sawfly eggs recorded each year in 200 twig samples.

population decline was caused primarily by virus infections, with the help of several natural insect enemies.

Application

The results of this sampling method indicate that the trend of white-fir sawfly populations may be foretold in true fir forests before damage is done. A 200-twig sample taken in successive years from 100 randomized trees in any given area before the eggs hatch should provide the basis for doing so. Whenever the egg population in a sample of this character exceeds 20 clutches, damage can go beyond a desirable limit and control may be necessary.

Twenty clutches indicate a mean population of about 1,000 larvae per 200-twig sample. If uncontrolled, populations of this magnitude will not only cause noticeable defoliation, but are likely to produce increased numbers of sawflies that will cause further damage.

The long period in the egg stage makes it possible to sample the white-fir sawfly populations far in advance of damage. This fact is distinctly advantageous in early planning for control.

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Fertilizing Cleft and Bottle Graft Scions in an Attempt to Increase Graft Unions

Grafting southern pine scion material from older trees onto young stock plants is frequently a discouraging project in terms of graft success. Any treatment that could be imposed on the grafts to increase the success of unions between scions and stock plants would be most welcome to plant propagators. A scion-fertilization study was started at the Lake City, Florida, Research Center of the U. S. Forest Service in an attempt to improve grafting success. Treatments used were not successful in increasing graft take, but the results are reported here for the information of others interested in the grafting of slash pine (*Pinus elliottii* Engelm.).

In January 1958, 20 scions were taken from each of 4 slash pine ranging in age from 30 to 45 years. All grafting was done on potted stock the day after the scions were removed from the trees. The bottle-graft technique described by Mergen[1] was used for half of the scions. The other half were grafted using a dormant tissue cleft graft.

Half the bottle grafts from each tree were filled with a primary nutrient solution recommended by Hoagland and Snyder.[2] The remaining bottle grafts were treated with well water. In both cases the bottles or vials were kept filled for the duration of the test.

On one-half of the cleft grafts from each tree the scions were sprayed with a 2.5-percent solution of phosphoric acid immediately after grafting, and were also sprayed weekly for 10 weeks with solutions of 1.2-percent ammonium nitrate, 1.0-percent potassium sulfate, and 1.5-percent magnesium sulfate (Boynton, 1954).[3] The other half were left untreated as a check.

On April 16, 1958, approximately 3 months after grafting and treatment began, a survival count was made to determine treatment effect. Results are shown in Table 1.

Since the fertilizer applied to the cleft grafts was different from that applied to the bottle grafts, each graft-treatment combination was

[1]Mergen, Francois and Harry Rossoll. How to root and graft slash pine. U. S. Forest Service, Southeastern Forest Expt. Sta. Paper 46. 1954.

[2]Hoagland, D. R. and W. C. Snyder. Nutrition of the strawberry plant under controlled conditions. Amer. Soc. Hort. Sci. Proc. 30:288-294. 1933.

[3]Boynton, Damon. Nutrition by foliar application. Ann. Rev. Plant Physiol. 5: 31-54. 1954.

(*Continued on page 514*)

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TABLE 1.—NUMBER OF GRAFTS LIVING, BY TREATMENTS, 12 WEEKS FOLLOWING TREATMENT. FIVE GRAFTS WERE MADE PER TREE PER TREATMENT

Tree	Bottle graft		Cleft graft	
	Fertilized	Check	Fertilized	Check
1	3	4	1	4
2	0	3	2	2
3	4	4	0	4
4	3	5	0	3
Total	10	16	3	13
Percent success	50	80	15	65

TABLE 2.—RESULT OF MULTIPLE RANGE TEST OF SIGNIFICANCE OF GRAFT SUCCESS

	Fertilized		Check	
	Cleft graft	Bottle graft	Cleft graft	Bottle graft
Total	3	10	13	16

Note: Any two totals *not underscored* by the same line are *significantly different.*

handled as one of four separate treatments and analyzed as such. An analysis of variance showed that differences due to treatment were significant at the 5-percent level, and the results of a multiple range test are shown in Table 2. Both types of graft were adversely affected by the fertilizer treatments, but there was no significant difference between the success of untreated cleft grafts and treated bottle grafts.

The study shows that scion-fertilization treatments in the concentrations used do not have a beneficial effect on the success of either cleft or bottle grafts. In any further studies using these techniques, a lower range of concentrations of nutrient solutions is suggested.

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Southeastern Forest Expt. Sta.,
Forest Service,
U. S. Dept. Agric.

PROPOSED MEETING ANNOUNCEMENT

Forest Geneticists to Meet at Placerville Prior to S.A.F. Meetings

The S.A.F. Committee on Forest Tree Improvement and the Western Forest Genetics Association will meet together at the Institute of Forest Genetics, Placerville, California, on November 13 and 14, 1959. The Institute's pioneering work in basic forest genetics research makes it the "Mecca" of American tree breeders, thus an ideal place for the joint meeting.

F. I. (Pete) Righter, chief, Division of Forest Genetics Research, California Forest and Range Experiment Station, U. S. Forest Service, and host of the meeting, assures participants of an interesting, guided tour of genetics installations on or near the Institute grounds. Other highlights of the meeting will be presentation of several forest genetics research papers, plus the regular business meeting of the W.F.G.A. Interested foresters are welcome. Apply well in advance to the Chairman, Committee on Forest Tree Improvement, Society of American Foresters, Northern Idaho Forest Genetics Center, 1221 South Main Street, Moscow, Idaho, for attendance applications.

A complete list of titles and authors of research papers to be presented at this joint meeting will be included in the annual S.A.F. Meeting Program.

R. T. BINGHAM, *Chairman*
S.A.F. Committee on Forest Tree Improvement

Points of View

Comments on New Growth Percent Formulae

Professor Belyea's article[1] in the February 1959 JOURNAL OF FORESTRY adduces the usual *a priori* arguments favoring compound interest, concerning which foresters can form their own opinion by observing actual volumes of an uncut timber stand at three or more points in time.

His arguments for a so-called "organic" projection do not mention the fact that this projection, when correctly used, is exactly the same as the compound-interest projection. He appears to advocate that $\log_e (1 + C)$ be used as an approximation for compound-interest rate (C) in the familiar compound-interest rate formula. Incorrectly used as a substitute for compound interest, the "organic" rate will not validly project initial volume to actually measured terminal volume. The magnitude of bias involved in doing this can be tabulated exactly, as I have done in Figure 3.

Professor Belyea also advocates a "geometric" rate which is merely simple interest (start of term) multiplied by the square root of $\frac{\text{initial volume}}{\text{terminal volume}}$. Presumably he intends that this too be used as an approximation for C in the compound-interest formula, because the "geometric" rate cannot be used in a legitimate projection function connecting any two of the three given quantities (initial volume, terminal volume, or their geometric mean).

In the interest of clarifying names, algebraic relationships, and appropriate bases for valid volume projection by the various "rate" formulae, I have prepared Figures 1 and 2.

All three of the simple-interest formulae (extended as necessary) will pass through initial V_o, terminal V_n, and arithmetic mean $\frac{V_o + V_n}{2}$. The differences in rates S, M, and T merely compensate for the difference in base. The assumption is that stand volume per acre increases a constant amount each year—or that it will plot as a straight line.

The three compound-interest formulae (extended as necessary) involve a single rate C and pass through initial V_o, terminal V_n, and geometric mean $\sqrt{V_n V_o}$. The assumption is that stand volume per acre increases in ever-increasing amounts each year—or that it will plot as an upward-cupped curve.

The two logarithmic forms of the compound-interest formulae involving L and B describe exactly the same upward-cupped curve as the basic compound-interest curve. Some people think that it is simpler to work with logarithms than compound-interest tables. For instance, the sum of $\log_{10} V_o$ plus (B times n) equals $\log_{10} V_n$. If, however, L is used as an approximation for C in the compound-interest formula, V_o cannot validly be projected to V_n. The biased approximate value of C is compared with the correct value in Figure 3. Bias increases as C increases.

Logically, the proper way to project stand volume by using rate formulae is to calculate the rate from V_o, V_n, and n in the past, express in appropriate terms the future time to which projection is desired, and use the appropriate function and base shown under "Valid Connection or Projection" in Figure 1. All of the following simple interest projections to (n

NAME OF GROWTH RATE	DEFINITION	VALID CONNECTION or PROJECTION
Simple interest (start of term)	$S = \frac{V_n - V_o}{V_o}\left(\frac{1}{n}\right)$	$(1+nS)\ V_o = V_n$
Mid-term simple interest (Pressler's rate)	$M = \frac{V_n - V_o}{V_n + V_o}\left(\frac{2}{n}\right)$	$\left(1 \pm \frac{n}{2}M\right)\frac{V_n + V_o}{2} = V_n$ or V_o
Terminal simple interest	$T = \frac{V_n - V_o}{V_n}\left(\frac{1}{n}\right)$	$(1-nT)\ V_n = V_o$
Compound interest (start of term)	$C = \sqrt[n]{\frac{V_n}{V_o}} - 1$	$(1+C)^n\ V_o = V_n$
Mid-term compound interest	same	$(1+C)^{\pm\frac{n}{2}}\sqrt{V_n V_o} = V_n$ or V_o
Terminal compound interest	same	$(1+C)^{-n}\ V_n = V_o$
Compound interest (natural logs)	$L = \frac{\log_e V_n - \log_e V_o}{n}$	$(e^L)^n\ V_o = V_n$
Compound interest (Briggsian logs)	$B = \frac{\log_{10} V_n - \log_{10} V_o}{n}$	$(10^B)^n\ V_o = V_n$
"Geometric" rate	$G = \frac{V_n - V_o}{\sqrt{V_n V_o}}\left(\frac{1}{n}\right)$	none

N.B. Use of L or G as approximations for C will inevitably inject some bias.

FIG. 1.—Definition of so-called "growth rates" and valid connections or projections involving them, where n = number of years, V_o = initial volume, and V_n = terminal volume.

[1]Belyea, Harold Cahill. Two new formulae for predicting growth percent. Jour. Forestry 57:104-107. 1959.

S = Annual simple interest on initial volume

$$G = S\sqrt{\frac{V_0}{V_n}}$$

$$M = S\left(\frac{2V_0}{V_n + V_0}\right)$$

$$T = S\left(\frac{V_0}{V_n}\right)$$

$$C = \sqrt[n]{1+nS} - 1 \quad \text{(or compound interest)}$$

$$L = \log_e(1+C) = C - \frac{C^2}{2} + \frac{C^3}{3} - \cdots = 2.3026\,B$$

$$B = \log_{10}(1+C) = \frac{\log_{10} V_n - \log_{10} V_0}{n} = .4343\,L$$

FIG. 2.—Algebraic relationships between various so-called "growth rates" used in projection, where n = number of years in period, V_0 = initial volume, and V_n = terminal volume at end of n years.

C	$L = \log_e(1+C)$	$C - L = \frac{C^2}{2} - \frac{C^3}{3} + \frac{C^4}{4} - \ldots$
.01	.00 995	.00 005
.02	.01 980	.00 020
.03	.02 956	.00 044
.04	.03 922	.00 078
.05	.04 879	.00 121
.06	.05 827	.00 173
.07	.06 766	.00 234
.08	.07 696	.00 304
.09	.08 618	.00 382
.10	.09 531	.00 469
.11	.10 436	.00 564
.12	.11 333	.00 667
.13	.12 222	.00 778
.14	.13 103	.00 897

FIG. 3.—Comparison of compound-interest rate (C) with logarithmic aproximation (L).

+ 5) years are identical, even though bases, rates, and time intervals differ:

$$V_{n+5} = [1 + (n+5)\,S]\,[V_0]$$
$$= [1 + (5)\,T]\,[V_n]$$
$$= \left[1 + \left(\frac{n}{2} + 5\right)M\right]\left[\frac{V_0 + V_n}{2}\right]$$

The three compound-interest formulae employ different time intervals and bases but have identical C's.

If an upward-cupped curve of stand volume over time is assumed, use of S with V_n will project to exactly the same V_{2n} as would use of C with V_n. Thus, even for those who close their eyes and insist that volume growth tends to follow an ever-accelerating upward-cupped curve most of the time, there is a simple-interest alternative which coincides with compound interest calculations where the forward projection is equal in time to the period over which growth was measured in the past. Use of M with V_n would assume somewhat less volume acceleration than using either S or C with V_n. Other manipulations involving different assumptions are not hard to visualize.

It should be quite obvious from Figures 1 and 2 that numerical differences between S, G, M, T, C, L, and B are to be expected since they either appear in different projection functions or are used with different bases. All of them will project from an appropriate base (except G, which cannot validly project) to the same V_n. Hence, the demonstration of numerical "rate" differences in Professor Belyea's Table 1 on page 107 of the February 1959 JOURNAL proves nothing, even if one accepts the exponential curve involving C as being most realistic (which I do not).

Professor Belyea's Table 1 does demonstrate that using compound interest or logarithms in growth projection can easily result in arithmetic errors probably due to faulty table entry or interpolation. In his 8-inch d.b.h. class, he gives $C = .10850$, $L = .10584$, and divergence $(C - L) = .00266$. A table of the necessary relationships between these quantities is given in Figure 3, which shows that when C lies between .10 and .11, then $(C - L)$ must lie between .00469 and .00564 (which his .00266 does not). Similarly, in his 22-inch class, where $C = .02217$ lies between $C = .02$ and $C = .03$, the true $(C - L)$ or divergence shown in Figure 3 must lie between .00020 and .00044 (which his .00108 does not). There are also other inconsistent items in his Table 1, indicating computational errors. It would appear that the computational complication of logs and compound interest is a serious disadvantage even when used by sophisticated people.

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Comments on "What is Unit Area Control?"

What is unit area control? This is still a good question after reading LeBarron's presentation in the September 1958 JOURNAL.[1] In this article and elsewhere one can get a miscellany of definitions and semi-definitions such as a "silvicultural concept" (but *not* a system); a "management method"; "a system —an orderly approach to the problem of accomplishing continuous forest production"; a "complex idea"; and more generally, management by small units emphasizing an ecological approach, regeneration, and treatment of groups rather than individual trees, to name some. The term was coined by Dunning, further developed by Hallin, and the concept has developed in the national forests of California.

Basically, it seems to boil down to identifying small stand condition groups or classes and treating them according to their silvicultural needs using any means appropriate. This general idea is not at all new and scarcely seems to justify coining a new term, calling it a "system," etc. Why, then, the term and the vogue it seems to be having in the West?

Taken in its U. S. Forest Service context in California where it developed, the approach has much significance. Research foresters there have long felt that cutting practices applied in pine were not resulting in satisfactory regeneration, there was too much brush encroachment, and the like. National forest marking rules tend to emphasize individual tree selection by tree risk or condition classifications and often have been rigidly applied. The idea of unit area control was born in this situation. It is something of a charter of silvicultural flexibility, an approach designed to come to grips with the definitely on-the-ground job of keeping forest lands continuously productive. The inherently rather elusive nature of such a general concept is in itself of virtue in that it generates direct thinking about the needs of the forest. As a rallying point for a more effective management policy, it is wholly desirable.

But a largely internal situation does not seem a sound professional basis for trying to establish such a rather vague "system" as something new and special for general coinage. Indeed, one might venture the thought that the drive to establish unit area control merely indicates slowness on the part of national forest managers to appreciate fully the stubborn nature of some silvicultural problems.

The idea of unit area control bears a strong resemblance, in both substance and setting, to the *Methode du Controlle* or "check" method of Gurnaud and Biolley, developed in the latter part of the last century in France and Switzerland. This approach grew in substantial part out of a revulsion against rigidity and formalism in management practice, as developed in German forestry particularly. Kunchel[2] describes the "check" method as "an improved kind of forest management whereby all parts of the forest are brought into a state of highest productive capacity in perpetuity." This would serve admirably for unit area control too and sounds very much like just good forestry. Nobody can be against it as a general aim.

These enveloping kinds of concepts have a somewhat irritating way of being used something like tents. In the "check" or unit area control tent, for example, is included all that is sensible, flexible, applicable, etc., about forest practice, and, by implication, that which is arbitrary, rigid, inapplicable, etc., is in someone else's tent. This sort of thing went on when selective timber management was in style. In fact, the unit area control approach is in some degree a reaction against an over-dose of this wave of thinking as applied to pine management.

Considered as a management method, which unit area control has been designated and applied, some real difficulties arise, particularly as regards the "control" part of the term. In its treatment by Hallin in a manuscript (unpublished) based on experience on the Black's Mountain Experimental Forest of California, unit area control seems to devolve into complex even-aged management based on clearcutting in rather small patches. The same sort of thing shows up in the recent management plan for the Boise National Forest in Idaho. LeBarron says "5 acres seems most desirable, although a final conclusion has not been reached." By the nature of the approach, it hardly could be.

The difficulty is that, as management entities, the "unit" areas are small and changeable. In these mosaic-like forests characteristic of much of the pine region (and elsewhere), significant stand condition classes from a treatment standpoint are hard to identify and handle as actual management units. Their boundaries are very irregular and in large part due to past forest history of fire, insects, disease, and cutting rather than to any permanent site differences. Age classes are considerably scrambled within as well as between unit areas. Since the essence of the approach is flexibility and use of all applicable silvicultural methods, it is hard to see how any set cutting method can be employed and these many small units retain any fixed identity from a management control standpoint. In practice, unit area control seems more like somewhat king-size group selection than even-aged management.

It is very difficult to organize and operate a true even-aged framework of management unless the component stands are large and permanent enough to be mapped and inventoried as such. The areas recognized can be small but this requires really intensive management—which is not yet in western pine management. To organize and

[1] LeBarron, Russell K. What is unit area control? Jour. Forestry 56:662-663. 1958.

[2] Kunchel, Hermann. Planning and control in the managed forest. Tr. by M. L. Anderson. Oliver and Boyd, Edinburgh. 1953.

operate an even-aged management program, one must have good knowledge of age-class structure and where the stands are. If small units down to around 5 acres are to be recognized and identified, the inventory job is considerable. It has never been made clear by the proponents of unit area control just how unit areas are to be mapped and handled as inventory units—a necessity for their direct use in management control.

This sort of problem has already appeared on the Boise. In a personal letter, Mr. Monerief pointed out to me that when small units were recognized they were finding considerable discrepancy between age-class data given by the survey and actually found on the ground. It was estimated that possibly 40 percent of the area classified as virgin sawtimber was actually in poles and saplings. This would mean increasing the area estimate for this class from 13,281 to perhaps 170,000 acres indicating a much better age-class structure than previously assumed. He added that substantiation of this estimate would mean a complete revision of the regulation section of the plan. It seems to me that the cost and level of inventory control system needed to initiate and maintain a unit area kind of approach should be given very careful thought.

The avidity with which the unit area control idea is being seized by some national forest regions is somewhat surprising. It is hoped that this interest is accompanied by full understanding of what execution of the approach entails. Identification and productive treatment of small areas is certainly desirable but this must be tempered by awareness that perpetuation of a more or less happenstance assortment of small unit areas is not the goal. Purposeful management entails unifying treatment of stand condition classes to bring about a simpler and more operable situation. It should also be recognized that the same sort of general approach as unit area control has been and is being applied in other forest areas of the United States as a part of more intensive management without thought of trying to give it a special name.

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What Should We Call the Chemical Tree Killer?

The term silvicide seems to be creeping into the silvicultural literature (see *Forestry Terminology*). Although I realize that our language develops on the basis of usage rather than "correctness" (would that this fact were recognized in relation to plant names), I feel, like Canute, obliged to register a protest against silvicide on etymological and logical grounds.

Silvicide means, if we analyze it, either forest killing or forest killer. If we sometimes kill a forest with these chemicals, at least that is not our intent. If we must have a special term, which I doubt, to denote a selective plant killer used in silviculture, let us show enough regard for language and logic to say arboricide (tree killer) or fruticide (shrub killer). Frankly, I think both terms are too pedantic, and the latter open to misinterpretation.

What then is wrong with *herbicide?* When we speak of silvicides, we are referring to the very same compounds which are used in agriculture and horticulture as herbicides. While we may feel that it would have been better if the inclusive term *phytocide* (plant killer) had come into general usage, we must recognize that *herbicide* is here to stay. I trust that silvicide is not.

JOHN W. DUFFIELD
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Book Reviews

Economics of American Forestry

By Albert C. Worrell. 441 pp. Illus. John Wiley and Sons, New York. $9.75.

In terms of American forestry's lifetime, forest economics is an old subject. As a basic portion of the forester's training, economics has long been entrenched in the curricula of the forestry schools, but strangely, acceptable text books have been lacking.

As far back as 1902, B. E. Fernow wrote on the *Economics of Forestry*. Fernow's book is still interesting to read, but his concept of economics seems quaint today. Fernow included a large share of the whole forestry field: biological and physical aspects of forestry practice, forest description and statistics, public policy and history.

This reviewer recalls his own undergraduate training in the mid-thirties when the so-called Copeland Report served as a text book in forest economics. Perhaps *The Economics of Forestry* completed in 1930 by W. E. Hiley, a British forester, served as a text book in some schools, but Hiley was concerned mainly with forest valuation, finance, and accounting. Ralph Marquis' *Economics of Private Forestry*, published in 1939, was a well written book penned by a trained economist. However, it explored only a few aspects of forest economics. Then came P. L. Buttrick's *Forest Economics and Finance* in 1943. To foresters with some training in economics, Buttrick's book was only partially usable. Its orientation was strongly to forest valuation, finance, and business operations.

Now comes Albert Worrell's *Economics of American Forestry* to help fill the text book void which has so long characterized forest economics. It does so admirably.

Professor Worrell has written a book which applies modern-day economic principles and analysis to the field of forestry. Relevant economic theory is discussed lucidly, in simple terms readily understandable to forestry students. The examples cited to illustrate theory are taken from forest management and from the harvesting, marketing, and processing of forest products. Moreover, the illustrations frequently are realistic presentations of forestry problems.

The coverage of *Economics of American Forestry* is comprehensive. Chapters are devoted to the consumption of forest products and services, consumer demand, future demand, supply, production economics, growing and harvesting forest products, forest land economics, capital, labor, marketing, prices, and ownership of forests and forest enterprises. Other chapters discuss general economic aspects of forestry, social costs and benefits, unpriced forest products and services, and policy aspects of forest economics.

With such broad coverage, it is not surprising that the adequacy of treatment is uneven. Some of the chapters are outstandingly good. Other chapters are brief and their content is sketchy. For example, one might have hoped for fuller treatment of time-cost analysis, financial maturity concepts, optimum stocking and marginality in trees and logs. Again, the reader is struck by the almost complete neglect of important areas of forest economics such as taxation, insurance, and credit. Nevertheless, despite obvious weaknesses and omissions, *Economics of American Forestry* is, on the whole, a very good book.

Professor Worrell deserves high praise for successfully tackling a difficult subject. He has had to explore an area with few good bench marks to guide him, but he has come up with a very competent book which will greatly facilitate the teaching of professional courses in forest economics. Practicing foresters whose grasp of economics is weak or rusty will also find the book worthwhile; they may gain much stimulation and fresh insights into the economic problems which surround and permeate the practice of forestry.

LEE M. JAMES
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Accreditation in Higher Education

By Lloyd E. Blauch. 247 pp. U. S. Department of Health, Education, and Welfare, U. S. Government Printing Office, Washington 25, D. C. $2.50 (cloth); $1.50 (paper).

In organizing and editing this book, Lloyd Blauch has done a considerable service for the academic and professional communities in the United States. The volume is designed as a basic reference rather than a critical review and provides excellent descriptions of accreditation operations and their genesis.

The book is divided into three major parts: I, Nature and Evolution of Accreditation; II, Accreditation by State and Regional Agencies; and III, Accreditation of Education for the Professions. This is a logical organization.

Part I provides a general background and describes the work of the coordinating organizations. Part II discusses the work of the great regional associations and the state agencies that accredit entire institutions. Part III covers the

accreditation activities of the several professions.

The book is not difficult to read but, due to the fact that each of its forty chapters was written by a different individual, there is a certain amount of unevenness of pace and style between chapters. For most individuals using the book, however, this will not be of much importance. Under normal circumstances a person probably would read all of Part I and then go on to the few chapters describing accreditation activities in a given region and/or profession, ignoring the great many chapters that are not pertinent to his specific interests.

Following this reasoning, foresters probably will be most interested in Part I, the chapter describing the regional accrediting agency covering his area, and the chapter on forestry. Henry Clepper has done a good job as author of this chapter.

As was previously stated, the book consists primarily of descriptions of accreditation programs and their development, each written by an individual associated with the agency or organization described. In most cases consideration was given to the following items: the organization charged with the responsibility of accrediting in that particular area or field; the origins of accreditation; the purposes of accreditation; the bases for accreditation, the accreditation; the accreditation procedures; the costs of accreditation; and finally, the results of accreditation.

It is unfortunate that this last item was not reported in a more objective manner. Men closely associated with accreditation probably are not the best judges of the effectiveness of their programs. In my opinion, it would be desirable if the Office of Education, or some other impartial body, were to review the situation. The results of such an evaluation would provide the accrediting agencies with valuable data for the intelligent modification of their policies and procedures.

In reading this volume one cannot help but be struck by the fact that all the accreditation agencies are interested in securing sufficiently high qualitative results so that the region or profession does not suffer because of the influx of inadequately prepared individuals. Indeed, this is at the core of most accreditation programs. At the same time, it is quite evident that in almost all cases the criteria are quantitative, including such things as size of endowment, salary scales, size and completeness of library, academic degrees held by staff members, and publications.

Furthermore, the existing criteria seem to stress the material resources of the schools rather than the ability of the teachers. Apparently, it is assumed that a person with a certain number of degrees and a certain number of publications working in an institution with a certain minimum budget, a certain minimum salary scale, a certain library, in a certain building with a given number of rooms and laboratories, will automatically do an adequate job. To the mind of this reviewer, this seems to be a dangerous fallacy. It would be very desirable if emphasis could be shifted from the existing quantitative approach to one based more on the end result.

The chapter describing the National Commission on Accrediting is of interest because it bears on the development of new accrediting bodies. At the present time such agencies are in the process of development in areas once considered within the domain of the SAF and which were lost to the SAF by, to the mind of this reviewer, rather shortsighted policies.

It would be desirable if the individuals working for the establishment of these new accrediting bodies were to review this section, particularly the part dealing with the policies of the commission. They will note that new accrediting bodies are actively discouraged from beginning operations. If this reviewer interpreted the material correctly, the commission would prefer to see such organizations work through existing accreditation agencies. Perhaps the best example of a multiple agency is the Engineers' Council for Professional Development. Here is a challenge for the SAF and for other professional groups in the area of land use management and utilization of renewable resources. Let them combine operations in the manner of the engineers!

EVERET W. JOHNSON
Syracuse, N. Y.

❦ ❦ ❦

Conserving Natural Resources

By Shirley Walter Allen. 2nd ed. 370 pp. Illus. McGraw-Hill, New York. 1959. $6.75.

The first (1955) edition of *Conserving Natural Resources* was excellent. This second edition is better. Both demonstrate the unity possible when one author writes an entire text. Hence, the discussion of water power does not urge the exploitation of that resource wherever economically practicable, while leaving to another chapter author the need for warning that hydroelectric developments can ruin anadromous fisheries. Yet the book possesses much of the profundity and breadth of treatment sought, in competing texts, by assigning the various resources to individual specialists.

Because only one author is responsible, the book could be written in seven chapters. These are: (1) Introduction; (2) The Land, the Soil, and Conservation; (3) Water and the Atmosphere; (4) Forests, Grazing, and Recreation; (5) Wild-animal Resources; (6) The Mineral Resources; (7) Human Powers as Natural Resources.

Teachers of conservation courses taught in few credit-hours find the small number of chapters easier to "talk out" than material in more compartments. *Suggestions to Teachers for the Use of Conserving Natural Resources*, sent gratis to those who adopt this text, help in partitioning it for courses of different lengths. The student or citizen reading his first conservation book, or the professional reviewing recent developments, finds here a unified brevity difficult to achieve

in the starts and stops of symposia.

One of Professor Allen's outstanding abilities is his intense interest in and propensity for action through professional or governmental organization. Consequently this book accents conservation through organization more than it does resources saved by the individual with a tight hand on the faucet, a gentle foot on the accelerator, and "regular" gasoline in the tank, though Chapter I ends with *Individual Responsibility for Conservation*. However, few conservation books list these in greater detail, and omission permits the instructor or reader to assert *his* expertness.

In any conservation book, professional workers can find hairs not split to their choice. Allen's new edition does not mention synthetic sponges which rival those nature grows, that mosquito control has a middle choice of drainage patterned for fish survival, that many national park areas had been dedicated to another use after their removal from the public domain, and that the Park Service will not celebrate its 50th anniversary until 1966. Yet a paragraph-by-paragraph comparison of the two editions reveals an impressive attention to changes of recent years and an accuracy few, unaided, could equal.

Various categories of waste are stressed. Atomic energy is considered as a substitute for fossil fuels. Atmosphere as a natural resource is ably discussed. Increasing, overlapping, demands for space which torment land-managers are emphasized. The "slow and cautious machinery of democracy," and its advantages and responsibilities thread through the book.

Professor Allen avoids the customary demagoguery of eulogizing humans as our greatest resource. He instead praises constructive human powers.

Innovations include designating illustrations by chapter numbers joined by hyphens to the number of the figure in each chapter. New illustrations occur where appropriate. Finally, for those who wish we also could conserve words, here is a tidy book instead of a tome.

J. V. K. WAGAR
Colorado State University

Environmental Conservation

By Raymond F. Dasmann. 307 pp. Illus. John Wiley and Sons, New York. 1959. $6.50.

In the author's words, *Environmental Conservation* grew out of a need for a text written from a biological standpoint, which would take a long view of conservation problems by considering the human populations in relation to natural resources, their present predicament, and their future outlook.

The text is written from the viewpoint of an ecologist with a special interest in wildlife and, therefore, expresses the opinion that in any planning for the future of man on this earth, we must also plan for the wild land and wild creatures which have been a part of his heritage, and which must remain a part of his life if such life is to have much meaning.

Although the book is intended for use at lower division college level, it will certainly find ready use by professional planners in the conservation field.

Relating the subject to present international conditions, the author states that although USSR and USA have a highly favorable balance- between natural resources and population, the trouble spots in which the danger of war flares are the resource-deficient areas. Any permanent solution to international problems must include provisions for meeting the resource needs of the nations concerned. Responsibility rests heavily upon the shoulders of all of us. We have lost most of our margin for error. How we treat our natural resources will determine the future of mankind.

The author defines conservation of natural resources as use to provide the highest quality of living for mankind aimed toward both a material and spiritual enrichment for man on earth, now and in the future. Such definition will find ready acceptance by those administrators plagued by meat hungry hunters whose only measure of success is the kill and rapid return to town.

The text is well organized, with chapters dealing in traditional conservation fields, for instance, forests, range, water, soils, and human populations. Unlike some popular writings in the field, it is far from gaudy. Excellent references follow each chapter.

To the reviewer, the chapter entitled "Conservation of Environments" appeals as an excellent treatment of the interrelationship of the several natural resources. This chapter is recommended to those who use the term "multiple use" as though they knew what it meant.

Dasmann's *Environmental Conservation* is not the first book written in this field, nor will it be the last. It is, however, the reviewer's considered opinion that it is an excellent treatment of the subject. The text should furnish yeoman service on the desk of any person who is working toward a solution of the over-all problems of natural resource management.

HOWARD A. MILLER
U. S. Forest Service

My Partner, The River

By R. Dudley Tonkin. 276 pp. Illus. University of Pittsburgh Press, Pittsburgh. 1958. $6.

Subtitled "The White Pine Story on the Susquehanna," this book centers on the headwaters of the West Branch of that Pennsylvania river notably at Cherry Tree. There the stream gathers on a plateau rich in coal and rapidly regaining some of the forest wealth offered the hardy men who made the original timber available for building our country.

Lumbering for local needs started early. About 1835 the rafting of pine and oak ship's timbers began in Clearfield County. Soon rafts of boards also were moving from water-driven sash saws, to Marietta, Pennsylvania. This market was above Columbia where Route 30 crosses the Susquehanna below Harrisburg. Traders at Marietta bought spars, masts, and timbers for the ship yards on Chesapeake Bay and around Philadelphia and New York, accessible by canal. The wealth of West Branch pine was early known in New York State and Maine, some of whose canny sons began to buy timberlands.

Only Dudley Tonkin could have written this account. As a schoolboy in 1888 he ran to see the Michaels Brothers' drive "sack the dam." His father, Vincent Tonkin, born 1830, played a life-time part in logging pine, as shown by facsimiles of settlements for rafts, including one delivered at Marietta in 1852. The son saw the climax of the action and was brought up among leaders in the business who were good teachers. Youthful romantic ideas were modified by the responsibility of supplying timber to railroads, coal mines, and pulpmills. Having lived a lifetime with his subject, he knows the economics of logging.

In 1850 the river became a highway for loose timber as well as rafts. The state act of 1846 had authorized companies to stop and sort logs. The reader may be shocked to find only four pages of clear, simple language in this momentous act. No foreign views are cited, no vast bureaucracy established. The booms above Williamsport attracted numerous sawmills, all fed by the public-service monopoly of the boom company. In 1871 another act (two pages) offered driving rights on the river and tributaries to anyone who would improve and maintain the channels. Soon the drives were handled by a single corporation at agreed, standard charges from the mouth of any certain creek to the boom.

In addition to texts of laws and contracts, Tonkin describes in detail how rafts were made, the camps, river improvements, slides, logging methods. This reviewer would gladly have read more about the arks that housed rivermen and horses; also the French-Canadian batteau in which drivers pushed through rough flood waters with confidence and power, to the accompaniment of the loud boom of logs striking together. Seldom have men's efforts been more skillfully and economically directed than on the jobs of such leaders as Dick Cassaday. The sole effort was to get the work done, daylight to dark, dry or wet, with competition all the way.

Rewards were generous to the capable operator who would not bid too low. He built his improvements in the summer, logged in winter, and drove the streams in the spring. He had trouble when there was (1) no snow for hauling, (2) no water over the bar, or (3) too much water at the boom. Most of the operators met disaster at the time of the Johnstown Flood, 1889. The same rains fell on the West Branch. Many loggers lost all they had saved over years of success. Those landowners who retained much of their timber and the land fared best. Their profits are at work today wherever free enterprise thrives.

Tonkin is writing a sequel, *The Hemlock Story*. One may hope that he will describe the composition of the original forest and comment on the woods fires that burned each spring when coal camps were everywhere. Today's traveller in Clearfield County could hardly imagine the grim desolation of fifty or sixty years ago in fire time.

With all its hard facts, this book is delightful reading for many engaging characters are met and they contribute to an understanding that could hardly come to a newcomer, even a patient one.

HERMAN WORK
Staunton, Va.

Publications of Interest

Research in Southern Forestry by E. L. Demmon, published in January 1959, reports on a study undertaken at the request of the Southern Regional Education Board to review forest research activities underway in the South and suggests ways and means of improving correlation and coordination of forest research efforts. Full use was made in this review of the Society of American Foresters publication *Forestry and Related Research in North America*. In this 20-page report Mr. Demmon reviews historical and background information and the extent of current research now underway in the South. Given in tabular form are current annual expenditures and manpower devoted to forest research in the South, broken down by agency and activity. Significantly, in four state institutions current expenditures for forest research constitute but 3 percent of the total funds allotted for all agricultural research. Statistics are also given on numbers and kinds of degrees issued in recent years. The author points out that research may be coordinated through advisory committees on forest research and groups such as the Southern Forest Tree Improvement Committee and through the publication of annual reports. "Probably not over 15 percent of all current forest research activities can be classed as basic research, or that research which leads to new knowledge without regard to present-day application." The report concludes with recommendations for action by the Southern Regional Education Board which include the periodic revision and interchange of research project abstracts between schools, early publication of research results, issuance of annual reports, sponsorship of the compilation of lists of research subjects suitable for graduate theses, encouragement of group meetings and symposiums, exploration of opportunities for additional financing of research, the calling of attention to discrepancies between funds available for forestry and agricultural research, and arrangement of periodic reviews and appraisals of research at accredited forestry schools.

Current Literature

Compiled by MARTHA MEELIG, *Librarian, State University College of Forestry at Syracuse University*
Range Management Section Compiled by NELLIE G. LARSON, *Library, U. S. Department of Agriculture*

General

Essentials of Forestry Practice. By C. H. Stoddard. 258 pp. Illus. Ronald Press, New York. 1959. $5.50.

Études Forestières; Markhamia Lutea, K. Schum. By A. Michelson. 89 pp. Illus. Comité National du Kivu, Bruxelles. 1959. Nouvelle Sér. No. 9.

Forestry Handbook for British Columbia. 2d ed. 800 pp. The Forest Club. Univ. of British Columbia, Vancouver. 1959. $7.35 (Alma Mater Society).

A Year in Paradise. By Floyd Schmoe. 235 pp. Illus. Harper, New York. 1959. $4.50.

Farm Forestry

Farm Woodlots: Costs and Incomes; A Preliminary Report of the Work on the Penobscot Experimental Forest. 11 pp. Illus. Maine Extension Serv. in coop. with U. S. Dept. of Agric. 1959. Maine Ext. Serv. Cir. No. 338.

Forest Economics

Grading Logs and Trees for Quality. July 1955-1957; a bibliography comp. for The Log Grade Committee of the Forest Service by N. G. Larson. 11 pp. U. S. Forest Serv., Washington 25, D. C. 1959.

Forest Influences

Our Growing Water Problems. By R. G. Lynch. 60 pp. National Wildlife Federation, Washington, D. C. 1959.

Snow Behavior in Forests of Northern Minnesota and Its Management Implications. By Sidney Weitzman and R. R. Bay. 18 pp. Illus. Lake States Forest Expt. Sta., St. Paul, Minn. 1959. Sta. Paper No. 69.

Soil-Moisture Trends Under Varying Densities of Oak Overstory. By P. T. Koshi. 12 pp. Southern Forest Expt. Sta., New Orleans, La. 1959. Occasional Paper No. 167.

Forest Management

Indicators of Forest Land Classes in Air-Photo Interpretation of the Alaska Interior. By H. J. Lutz and A. P. Caporaso. 31 pp. Illus. Alaska Forest Research Center, Juneau. 1958. Sta. Paper No. 10.

Forest Resources

Availability of Beech in the Northeast. By E. L. Amidon and C. H. Stoltenberg. 14 pp. Northeastern Tech. Committee on the Util. of Beech in coop. with Northeastern Forest Expt. Sta., Upper Darby, Pa. 1959. Beech Util. Ser. No. 19.

The Forest Resources of Iowa. By P. L. Thornton and J. T. Morgan. 46 pp. Illus. Central States Forest Expt. Sta., Columbus, Ohio. 1959. For. Survey Release No. 22.

Timber in North Carolina. 24 pp. Illus. U. S. Forest Serv., Washington, D. C. 1959. For. Resources Rept. No. 15.

The Timber Resources of Delaware. By R. H. Ferguson. 30 pp. Illus. Northeastern Forest Expt. Sta., Upper Darby, Pa. 1959. Rept. on the Forest Survey.

Logging and Milling

Bibliography of Special Seasoning Methods. By C. J. Kozlik. 33 pp. Oregon Forest Products Research Center, Corvallis. 1959.

Lumber Recovery at a Ponderosa Pine Sawmill in the Black Hills. By E. S. Kotok and C. A. Newport. 14 pp. Rocky Mt. Forest and Range Expt. Sta., Fort Collins, Colo. 1959. Sta. Paper No. 19.

Selling Mill-Run and Graded Oak Lumber. By W. J. O'Neil. 16 pp. Illus. Univ. of Missouri Agric. Expt. Sta., Columbia. 1959. Research Bul. No. 685.

Pathology

Nursery Diseases of Southern Pines. By A. A. Foster. 7 pp. U. S. Forest Serv., Washington, D. C. 1959. Forest Pest Leaflet No. 32. 5 cents (Govt. Print. Off.).

Protection

The Forest Insect and Disease Situation Lake States, 1958. By G. W. Anderson and D. C. Schmiege. 18 pp. Illus. Lake States Forest Expt. Sta., St. Paul, Minn. 1959. Sta. Paper No. 70.

Forest Insect Conditions in the Central Rocky Mountains 1958. By A. E. Landgraf. 19 pp. Rocky Mt. Forest and Range Expt. Sta., Fort Collins, Colo. 1959. Sta. Paper No. 40.

Forest Insect Conditions in the Southeast During 1958. By W. P. Nagel. 10 pp. Southeastern Forest Expt. Sta., Asheville, N. C. 1959. Sta. Paper No. 100.

Microlepidoptera and Their Parasites Reared from Field Collections in the Northeastern United States. By J. V. Schaffner, Jr. 97 pp. U. S. Forest Serv., Washington, D. C. 1959. Misc. Publ. No. 767 (U. S. Dept. of Agric.) 35 cents (Govt. Print. Off.).

Range Management

Game/Livestock Competition in the Jackson Hole Region of Wyoming (Progress Report I). By D. R. Smith and D. E. Wilbert. 10 pp. Wyoming Agric. Expt. Sta., Laramie. 1959. Mimeog. Cir. No. 106.

Grass Varieties in the United States. By A. A. Hanson. 106 pp. U. S. Agric. Research Serv., Washington 25, D. C. 1958. Crops Res. No. CR-12-58.

Growth and Development in Certain Economic Grasses. By M. W. Evans. 112 pp. Illus. Ohio. Agric. Expt. Sta., Wooster. 1958. Agron. Ser. No. 147. Mimeog.

Laboratory Germination of Seeds of Weedy and Native Plants. By J. D. McGuire and A. Overland. 15 pp. Washington Agric. Expt. Sta., Pullman. 1959. Sta. Cir. No. 349.

Preparation and Application of Emulsion Sprays for Brush Control. By H. M. Elwell. 5 pp. Oklahoma Agric. Expt. Sta., Stillwater. 1959. Processed Ser. No. P-317.

Problems Involved in the Reseeding of Grasses on Abandoned Cropland. By R. D. Barmington. 15 pp. Illus. Colorado Agric. Expt. Sta., Fort Collins. 1957. Gen. Ser. Paper No. 658.

Weeds of Utah. By A. H. Holmgren. 85 pp. Illus. Utah Agric. Expt. Sta., Logan. 1958. Spec. Rpt. No. 12.

Silviculture

California Cone Crop—1958. By G. H. Schubert. 5 pp. California Forest and Range Expt. Sta., Berkeley. 1958. For. Research Notes No. 142.

Controlling Undesirable Hardwoods. By L. C. Walker. 24 pp. Illus. Georgia Forest Research Council, Athens. 1959. Rept. No. 3.

Effects of Planting Dates and Storage on Survival of Eastern Red Cedar in Central and Western Oklahoma. By Michel Afanasiev, Albert Engstrom and E. W. Johnson. 19 pp. Illus. Okla. Agric. Expt. Sta., Stillwater. 1959. Bul. No. 527.

Forest Fertilization, a New Era; a Handbook. The American Potash Institute from its magazine Better Crops with Plant Food. 53 pp. Illus. 1102 16th St., N.W., Washington 6, D. C. 1959.

Growth of Swamp Conifers Following an Improvement Cut. By D. D. Skilling. 10 pp. Illus. Lake States Forest Expt. Sta., St. Paul, Minn. 1959. Sta. Paper No. 71.

Possibilities of Breeding Weevil-Resistant White Pine Stands. By J. W. Wright and W. J. Gabriel. 35 pp. Illus. Northeastern Forest Expt. Sta., Upper Darby, Pa. 1959. Sta. Paper No. 115.

Wildlife Management

Michigan Whitetails. By D. H. Jenkins and I. H. Bartlett. 80 pp. Illus. by Oscar Warbach. Michigan Dept. of Conserv., Lansing. 1959.

Wood Technology and Utilization

Economic Improvement Through Forest Utilization and Development in Cumberland and Morgan Counties, Tennessee. By W. W. King and J. W. Lehman. 13 pp. TVA, Norris. 1959. Rept. No. 224-59.

Society Affairs

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Annual Meeting

Society of American Foresters

San Francisco, California, November 15-18, 1959

"Forestry and People" sets the theme for the 59th annual meeting of the SAF in San Francisco, November 15-18, 1959.

General Chairman John Callaghan, Program Chairman R. Keith Arnold, and Arrangements Chairman B. H. Payne are setting up a meeting designed to emphasize this theme and still give members, their ladies, and guests ample opportunity to enjoy their visit to the city by the Golden Gate.

San Francisco's Sheraton-Palace Hotel will be headquarters for the meeting and scene of all events—general session, Society Affairs session, nine subject Division meetings, and the reception and dinner Wednesday night.

The General Session

George A. Garratt, president of the Society and dean of the Yale University School of Forestry, New Haven, Conn., will open the general session on Monday morning, November 16. He has announced that all foresters and friends of forestry will be welcome, whether members of the Society or not.

Keynote speakers at the general session have been selected to bring out the impact of the West's expanding population on forestry in public agencies, industry, and education.

Charles A. Connaughton, regional forester, U. S. Forest Service, San Francisco, will give the opening address. Its title is "Impact of Population on Forest Management."

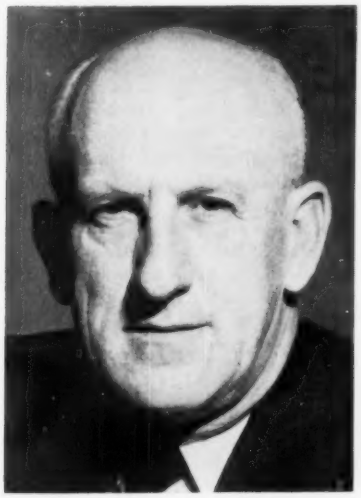
Clarence W. Richen, manager of Crown Zellerbach's Northwest Timber Department, Portland, Ore., will discuss "Industrial Responsibility and Vulnerability to Population Growth."

Henry J. Vaux, dean of the University of California School of Forestry, Berkeley, will review progress in his paper "Twenty Years of Population and Forestry Advances."

Society Affairs Session

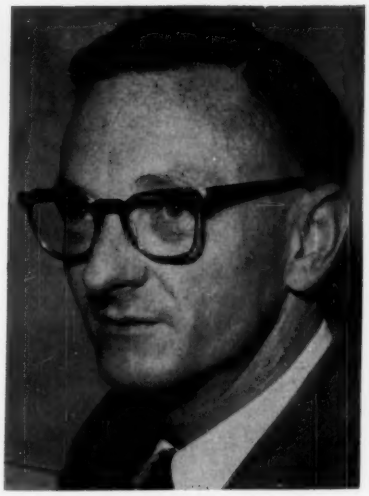
The customary Society Affairs session will be held Monday afternoon, November 16. In addition to reports by the president, executive secretary, editor, and committee chairman, the program will feature a panel discussion on state registration for foresters.

Because of the timeliness of this



CHARLES A. CONNAUGHTON

CLARENCE W. RICHEN



HENRY J. VAUX

topic and the widespread interest in it throughout the profession, this session promises to be well attended.

Division Meetings

Division chairmen of the Society are well started on their task of building trenchant technical sessions. Nine technical sessions have been scheduled. They will include 60 papers on the subjects of forest management, silviculture, forest products, forestry education, forest recreation, wildlife management, range management, watershed management, and forest economics and policy.

The schedule of events has been planned with both members and wives in mind. All Division meetings are scheduled during daytime hours to allow free evenings for visits to San Francisco's colorful Chinatown, Fisherman's Wharf, and other attractions in theaters, museums, and night life.

Ladies' Program

A special lounge has been set aside for ladies in the Sheraton-Palace where their registration will start Sunday afternoon, November 15.

On Monday morning they will be guests at a continental breakfast in the hotel.

On Tuesday there will be an all-day trip for ladies by special train to Monterey Peninsula with a bus trip through Monterey, luncheon in Carmel, and a stop at Mission San Carlos Borromeo de Carmelo.

The Annual Dinner

The Society's annual dinner will be served in the nationally famous Garden Court of the Sheraton-Palace. It will be preceded by a reception.

William D. Hagenstein, Council member from Portland, Ore., will preside at the dinner. A highlight will be the presentation by President Garratt of the Society's special award for achievement in biological research leading to the advancement of forestry.

The dinner will conclude with entertainment featuring the colorful Spanish-American influence in California.

Field Trip

A one-day field trip will be available on Thursday, November 19, to the Santa Cruz district, where a variety of forestry activities may be seen. Especially of interest will be demonstrations of conflicts in forest land use arising from urban growth. The trip will be made by chartered bus. Private cars will not be used.

Detailed information on the program and other events will appear in the August issue of the JOURNAL OF FORESTRY.

Schedule of Events

Sunday, November 15

SAF Council meeting; morning and afternoon.

Editorial Board, JOURNAL OF FORESTRY; afternoon.

Association of Consulting Foresters open meeting; evening.

Forest Tree Improvement Committee meeting; evening.

SAF Council and Section delegates joint meeting; evening.

Monday, November 16

General session; morning.

Society Affairs session; afternoon.

Alumni functions (no scheduled SAF meetings); evening.

Tuesday, November 17

Division of Silviculture meeting; morning and afternoon.

Division of Forest Products meeting; morning.

Division of Economics and Policy meeting; afternoon.

Division of Forest Recreation meeting; morning.

Division of Wildlife Management meeting; afternoon.

Ladies' tour to Monterey; all day.

Alumni and social functions (no scheduled SAF meetings); evening.

Wednesday, November 18

Division of Forest Management meeting, morning and afternoon.

Division of Education meeting; morning.

Division of Range Management meeting; morning.

Division of Watershed Management meeting; afternoon.

Reception and dinner; evening.

Thursday, November 19

Field trip to Santa Cruz Mountains; all day.

Hotel Reservations

Those planning to attend the meeting are advised to arrive in San Francisco on Sunday, November 15, or not later than 9 a.m., Monday, November 16. The first general session will start at 9:30 a.m., Monday, in the Sheraton-Palace Hotel.

The Sheraton-Palace, on Market Street at New Montgomery Street,

SOCIETY OF AMERICAN FORESTERS

1959 Annual Meeting

San Francisco, California. November 15, 16, 17, and 18

Housing Committee, Society of American Foresters,
Room 300, 61 Grove Street,
San Francisco 2, California.

First choice hotel _____

Second choice hotel _____

Third choice hotel _____

Please make a reservation for the following room accommodations for arrival on November———, a.m. p.m. Departure———, a.m. p.m.

I understand that accommodations will be provided at the daily rate specified, if available; otherwise the nearest rate available will apply.

——— Single room with bath. Rate $———.

——— Double-bed room with bath. Rate $———.

——— Twin-bed room with bath. Rate $———.

——— Suite (parlor, twin-bed room, and bath). Rate $———.

——— Other. (Specify accommodations desired.) Rate $———.

The above accommodations are requested for the following persons in addition to myself. (Please print or typewrite names and addresses legibly.)

_____

_____

_____

My name: _____

Street address: _____

City, zone, state: _____

Enclosed is a deposit in the amount of $———.

Important Notice: Members submitting requests for hotel reservations are asked to indicate below if their wives will wish to go on the all-day tour for ladies to Monterey on Tuesday, November 17.

☐ My wife wishes to go on the ladies' tour.

will be the headquarters for the meeting. The zone number is San Francisco 19.

This hotel has 700 rooms, but it will not be able to accommodate all those in attendance. Hence, other cooperating hotels are making space available.

All requests for room reservations should be sent to the Society of American Foresters Housing Committee, Room 300, 61 Grove Street, San Francisco 2, Calif. All reservations will be confirmed if the requests are received not later than Oct. 31.

For each room reserved, there should be an accompanying deposit of $10. Checks should be made payable to SAF Housing Bureau.

Reservations will be accepted and confirmed in the order of their receipt. Assignment of rooms will be made at, or as near, the desired rate as possible. Early reservation requests are desirable.

The reservation coupon printed herewith may be used. Readers who do not want to cut the coupon from their JOURNALS may request reservations by letter, provided all the information listed on the coupon is given.

Cancellations must be received 15 days prior to the meeting for refunds of deposits to be made by the hotel. If sufficient time is not allowed for the hotel to reassign space, the deposit is forfeited.

Hotels and Rates

All rates quoted are with bath; these are daily rates.

Sheraton-Palace Hotel, Market Street at New Montgomery Street; 700 rooms; adjacent garage. Single occupancy: $11 to $21. Double-bed rooms: $15 to $25. Twin-bed rooms: $15 to $25. Parlor suites: $28 up.

Bellevue Hotel, 505 Geary Street, at Taylor; 250 rooms; garage attached. Four blocks from Sheraton-Palace. Single occupancy: $7.50 to $10. Double-bed rooms: $9.50 to $12.50. Twin-bed rooms: $11 to $15.

Beverly-Plaza Hotel, 342 Grant Avenue, at Bush Street; 200 rooms. Six blocks from Sheraton-Palace. Single occupancy: $7 to $9. Double-bed rooms: $9 to $11. Twin-bed rooms: $10 to $12.

Californian Hotel, 405 Taylor Street at O'Farrell Street; 300 rooms; garage next door. Six blocks from Sheraton-Palace. Single occupancy: $9 to $11. Double-bed rooms: $11 to $13. Twin-bed rooms: $11 to $14.

Chancellor Hotel, 433 Powell Street; 150 rooms; garage service. Six blocks

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The land on which the stream is born will always be kept productive by skilled Weyerhaeuser foresters. As trees are harvested to meet America's demand for wood, new trees will take their place. Under this planned program of reforestation, the tree farm will continue its primary function of producing timber for the nation. It will also maintain its value as a watershed and wildlife habitat, and as a recreational area.

In carrying out our business of growing trees and producing forest products, we work to perpetuate not only our forests, but their benefits as well. *Write us at Box A, Tacoma, Wash., for an interesting, colorful free booklet,* ***Forest Products from Tree Farm to You.***

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from Sheraton-Palace. Single occupancy: $7. Double-bed rooms: $9. Twin-bed rooms: $10.

Clift Hotel, Geary at Taylor Street; 400 rooms. Six blocks from Sheraton-Palace. Single occupancy: $13 to $21. Double-bed rooms: $15 to $17. Twin-bed rooms: $16 to $23.

Drake Wiltshire Hotel, 340 Stockton Street; 250 rooms; garage available. Four blocks from Sheraton-Palace. Single occupancy: $10 to $11. Double-bed rooms: $12 to $14. Twin-bed rooms: $15 to $16.

Manx Hotel, 225 Powell Street; 300 rooms; garage service. Four blocks from Sheraton-Palace. Single occupancy: $6 to $9. Double-bed rooms: $9 to $11. Twin-bed rooms: $10 to $12. Parlor suites: $15 and $20.

St. Francis Hotel, Powell and Geary Streets (Union Square); 1,000 rooms. Four blocks from Sheraton-Palace. Parking in Union Square garage. Single occupancy: $11 to $22. Double-bed rooms: $13 to $20. Twin-bed rooms: $16 to $25. Parlor suites: $30 to $50.

Sir Francis Drake Hotel, 450 Powell Street, at Sutter; 600 rooms; basement garage. Six blocks from Sheraton-Palace. Single occupancy: $10.50 to $15.50. Double-bed rooms: $12.50 to $17.50. Twin-bed rooms: $15.50 to $20.50. Suites: $34 up.

Stewart Hotel, 351 Geary Street, at Union Square; 400 rooms, garage service. Four blocks from Sheraton-Palace. Single occupancy: $7 to $10. Double-bed rooms: $8 to $10. Twin-bed rooms: $10 to $18.

Sutter Hotel, 191 Sutter Street; 200 rooms. Two blocks from Sheraton-Palace. Single occupancy: $5 to $7. Double-bed rooms: $7 to $9. Twin-bed rooms: $8 to $10.

Whitcomb Motor Hotel, 1231 Market Street, at 8th; 500 rooms; ample parking. Seven blocks from Sheraton-Palace. Single occupancy: $7 to $12. Double-bed rooms: $9 to $16. Twin-bed rooms: $10 to $16.

YMCA, 351 Turk Street. Seven blocks from Sheraton-Palace. Single occupancy: $4.25 to $5.50. Double-bed rooms: $5.25 to $6. Twin-bed rooms: $7.

Motels and Rates

San Francisco has 30 motels. A list of them with their addresses and daily rates may be obtained on application to the Convention and Visitors Bureau, 300 Civic Auditorium, 61 Grove Street, San Francisco 2, Calif.

In requesting a motel reservation, payment equal to the daily rate but in no case less than $8 should accompany the reservation. Checks should be made payable to SAF Housing Committee.

The following motels will make rooms available if reservations are made at least 15 days in advance:

Broadway Manor Motel, 2201 Van Ness Street at Broadway. About 30 blocks from Sheraton-Palace. Single occupancy: $8 to $12. Double-bed rooms: $10 to $12. Twin-bed rooms: $12 to $14.

Lombard Plaza Motel, 2026 Lombard Street; U. S. Route 101. Two miles from Sheraton-Palace. Single occupancy: $6 to $8. Double-bed rooms: $8 to $10. Twin-bed rooms: $9 to $12.

Market Street Travelodge, 1707 Market Street. Fourteen blocks from Sheraton-Palace. Single occupancy: $8 to $10. Double-rooms: $9 to $12. Twin-bed rooms: $11 to $14.

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Earl W. Loveridge (1890-1959)

Earl W. Loveridge, assistant chief of the Forest Service, U. S. Department of Agriculture prior to his retirement in 1955, died May 26 at Washington, D. C. He was 68 years old.

A veteran forester and public service administrator, Mr. Loveridge had a varied career covering more than 40 years of service with the federal government in this country and on foreign assignments. He was widely known for his earnest championship of natural resource conservation and for his contributions to the advancement of administrative management techniques.

Mr. Loveridge received a Superior Service Award from the Department of Agriculture in 1948. In 1951, he was given the department's Distinguished Service Award in recognition of his "original work in forest, range, and related wildland conservation fields."

Mr. Loveridge was born in Oil City, Pa., in 1890. He entered the Forest Service as a student assistant in 1911, while still an undergraduate at Pennsylvania State University. Following his graduation with a degree in forestry, he worked for a brief period with the Pennsylvania Chestnut Tree Blight Commission, and then returned to the Forest Service as a field assistant. For the next three years he was on assignments in Minnesota, Florida, Arkansas, New Mexico, and Arizona.

In 1915, he became a forest ranger on the Santa Fe National Forest in New Mexico. Later he advanced to the position of assistant supervisor of this forest, and in 1920 he was named supervisor of the Carson National Forest in New Mexico.

In 1924, Loveridge was promoted to the staff of the U. S. regional office for the Southwestern Region. He was transferred to the headquarters office of the Forest Service in Washington, D. C., in 1927. Here his staff assistant duties included, in addition to supervision of forest fire control, personnel, and other administrative management functions, the development and application of scientific analysis methods to the land management responsibilities of the Forest Service. His *Job-Load Analysis and Planning of Executive Work in National Forest Administration*, a 236-page study published in 1932, received wide notice in the administrative management field both in government and in private industry.

Mr. Loveridge in 1935 was appointed assistant chief of the Forest Service in charge of administrative management. He served in this position until his retirement from the Forest Service in 1955. Following retirement, he entered the government's Foreign Agricultural Service and served for two years as agricultural attache with the American Embassy in Bogota, Columbia. In 1958, he went to Belgrade, Yugoslavia, on a 5-months technical assistance assignment to aid Yugoslavian forestry officials in the development of a long-range forestry program.

In 1950, Loveridge was appointed a member of a President's task force studying land management activities of the federal government.

In 1952, at the invitation of the Venezuelan Ministry of Agriculture, he made a study of its Department of Natural Resources to aid in the development of plans for the handling of lands, forests, and other resource activities.

He became a member of the Society of American Foresters in 1919 and was also a member of the Society for Public Administration.

Mr. Loveridge's son, Melvin E. Loveridge, is a member of the Forest Service now stationed in Denver, Colo. and of the Society of American Foresters.

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Leland G. Cox (1912-1959)

Leland G. Cox, associate director of research for United Fruit Company, Boston, Mass., died suddenly April 2 in Norwood, Mass. He was 46 years old.

Dr. Cox had been associated with United Fruit Company since 1952. His prior experience included teaching and research positions at the University of California and Cornell and work on special technical projects for Beech-Nut Packing Company.

Born August 16, 1912 in Dorris, Calif., Dr. Cox studied chemistry and forestry at the University of California, Berkeley, and received his B.S. degree in 1936. He began work toward his Ph.D. at Berkeley but later transferred to Cornell and completed his work there in 1942.

In 1943 he was co-recipient of the Vaughan Award for the best paper of that year in the field of floriculture. He was a member of Xi Sigma Pi, Sigma Xi, SAF, the American Chemical Society, the American Association for the Advancement of Science, Forest Products Research Society, and other honorary and professional organizations in the fields of chemistry and agriculture.

Sixth Call for Council Nominations

All members are hereby notified that the regular biennial election will be held December 5, 1959. A president, vice president, and nine other members of the Council will be elected for the two-year term 1960-1961.

The present Council is listed on page 524. Any or all of these incumbents may be renominated, provided they accept the nomination in writing.

Membership on the Council is restricted by the Constitution to Members (formerly Senior Members) and Fellows. Any Member or Fellow is eligible to hold office who is in good standing and who accepts the nomination in writing and declares his willingness to serve if elected.

Each voter will have an opportunity to ballot on all candidates for office. Council members are elected in accordance with the system of proportional representation. The procedure of proportional representation will be explained in a later issue of the JOURNAL. It is the system by which the Society has been electing Council members for more than two decades.

Table 1, page 136 February issue, shows distribution of Council members by states 1944-1959.

Candidates for the office of president are voted on separately; the candidate who receives the highest vote is declared elected president, and the candidate who receives the next highest vote is declared elected vice president. Thus all candidates for president are considered as nominated also for vice president.

How Nominations Are Made

The Constitution (Article VIII, Section 2) states the conditions under which nominations are made by petition.

1. Each petition shall name but one candidate.

2. All candidates must be eligible to hold elective office.

3. A petition shall bear the signatures of at least ten voting members who at the time of signing the petition are eligible to vote in the coming election. (Eligible voting members are Junior Members, Members, and Fellows in good standing.)

4. A voting member may not sign more than one nominating petition for president or more than one nominating petition for a member of the Council. That is, he may sign two, but no more.

5. Petitions must be in the Society office by September 19, 1959.

The Society has no special form for submitting nominating petitions. They may be written as follows:

We, the undersigned voting members of the Society of American Foresters, hereby nominate John Doe, a Member (or Fellow) for the office of president (or member of the Council) for the two-year term 1960-1961.

No nomination will be considered valid unless supported by the nominee's acceptance in writing.

The form of acceptance of a nomination may read as follows:

"I accept the nomination to the office of President (or to membership on the Council) of the Society of American

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Foresters for the two-year term 1960-1961, and agree to serve if elected."

All nominating petitions should be sent promptly to the Society office, 425 Mills Building, Washington 6, D. C. The executive secretary will gladly provide information about nominating or election procedure.

According to the Constitution (Article VIII, Section 1) a Nominating Committee has been appointed by President Garratt. The Committee is composed of the following members:

Chairman, Harry Wm. Dengler, Extension Service, University of Maryland, College Park, Md.

Earl J. Adams, 4705 Tenth Avenue South, Minneapolis 7, Minn. (State Division of Forestry.)

Robert R. Milodragovich, U. S. Forest Service, Cody, Wyo.

Harry M. Roller, Jr., Woodlands Department, International Paper Company, Mobile 9, Ala.

George Stenzel, College of Forestry, University of Washington, Seattle 5, Wash.

This committee is charged with the following duties:

1. To set the date of the election. (December 5, 1959, is the date.)

2. To provide for at least two candidates for the office of president, and at least nine candidates for membership on the Council.

3. To receive separate nominating petitions for the office of president and for each member of the Council, and to supplement such petitions when necessary with other nominations in order to comply with item 2 above.

The Nominating Committee will make no nominations of its own unless the voting membership fails to make the required minimum number of nominations by petition. Voting members should accordingly get busy and make their own nominations.

Nominations Received

On the date of going to press the following nominations had been received:

For President

C. A. Connaughton, San Francisco, Calif. (Council member 1958-1959.)

Henry J. Malsberger, Atlanta, Ga. (Vice president 1958-1959.)

E. T. F. Wohlenberg, Ukiah, Calif.

For the Council

B. E. Allen, Savannah, Ga. (Council member 1956-1957 and 1958-1959.)

William C. Bramble, Lafayette, Ind.

S. T. Carlson, Santa Fe, N. Mex.

Donald E. Clark, Denver, Colo. (Council member 1958-1959.)

Robert W. Cowlin, Portland, Ore.

Kenneth P. Davis, Ann Arbor, Mich. (Council member 1958-1959.)

George A. Garratt, New Haven, Conn. (President 1958-1959.)

W. D. Hagenstein, Portland, Ore. (Council member 1958-1959.)

Albert G. Hall, Washington, D. C.

Svend O. Heiberg, Syracuse, N. Y.

Robert N. Hoskins, Richmond, Va.

Horace R. Josephson, Washington, D. C.

Clemens M. Kaufman, Gainesville, Fla.

Wm. Morris Palmer, Jr., Natchitoches, La.

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James K. Vessey, Atlanta, Ga.

John Zivnuska, Berkeley, Calif.

HARRY WM. DENGLER, *Chairman*
Nominating Committee

Sixth Call for Fellow Nominations

All Members (formerly Senior Members) and Fellows of the Society are hereby advised that nominations for the grade of Fellow are now open. The election of Fellows will be held at the time of the Society's regular biennial election, December 5, 1959.

As defined by the Constitution (Article III, Section 7), "Fellows shall be foresters recognized generally throughout the profession as persons who have rendered outstanding service to forestry and to the Society. They shall be elected from the Members."

Nominations by Petition

The procedure for placing Members in nomination for the grade of Fellow is by petition. The Society has no printed form for this purpose; the petition may be typewritten thus:

We, the undersigned Members and Fellows of the Society of American Foresters, hereby nominate John Doe for election to the grade of Fellow in 1959.

Remember these simple rules:

1. A petition may not name more than one candidate.

2. It must be signed by not less than 25 Members or Fellows in good standing.

3. It should be accompanied by a factual, not eulogistic, biographical sketch of at least 300 words giving an account of the nominee's professional career and accomplishments.

4. It must be received in the executive office of the Society in Washington, D. C., not later than September 19, 1959.

The executive employees of the Society cannot be responsible for obtaining signatures on partially completed petitions or on petitions incomplete by reason of unacceptable signatures (that is, signatures of other than Members and Fellows in good standing).

Election Procedure

Fellows are not elected by the membership at large, but by a board of electors which consists of all present Fellows, the Council, the chairmen of the 21 Sections, and the chairmen of the 9 subject Divisions.

The system is described in Article IV, Section 4 of the Constitution. To win election a nominee must receive an affirmative vote of not less than one-half the total number of votes cast, as provided in Bylaw 11.

For the 1959 election there will be 128 electors, of whom 88 are Fellows. An elector has one vote only. A Fellow who is also a Council member has but one vote.

Significance of the Grade

The highest membership distinction that can be conferred by the Society, this grade is awarded in recognition of outstanding service to forestry and to the Society. Fellows do not pay increased dues; their dues are the same as those of Members.

Since the Society was founded in 1900, there have been 125 Fellows elected. At the present time the number of living Fellows is 88.

Since the last election in December 1957, three Fellows have died: S. R. Gevorkiantz of Minnesota, J. S. Holmes of North Carolina, and F. W. Morrell of Virginia.

A list of the current fellows was published in the May issue of the JOURNAL.

Fellow Nominations

On the date of going to press the following Members had been nominated for the grade of Fellow:

N. T. Barron, Franklin, Va.

Clifford H. Foster, Warrensburg, N. Y.

Bishop F. Grant, Athens, Ga.

L. R. Grosenbaugh, New Orleans, La.

George B. Hartman, Ames, Iowa.

Harold S. Newins, Gainesville, Fla.

F. X. Schumacher, Durham, N. C.

Harold G. Wilm, Albany, N. Y.

Ernest Wohletz, Moscow, Idaho.

Coming Events

National Shade Tree Conference

The 35th annual meeting of the National Shade Tree Conference will be held in the Statler Hotel, Detroit, Mich. August 17-21.

Northeastern Forest Tree Improvement Conference

The seventh annual Northeastern Forest Tree Improvement Conference will be held at the University of Vermont, Burlington, August 18-19.

Soil Conservation Society

The 14th annual meeting of the Soil Conservation Society of America will be held August 26-28 in Rapid City, S. Dak.

Central States Section

A joint meeting of the Central States Forest Tree Improvement Committee and Central States Section of the SAF will be held at the Ohio Agricultural Experiment Station, Wooster, on October 8 and 9.

Resolution Concerning Measurement Units

Whereas numerous publications on forestry subjects are prepared and distributed nationally and there is wide variation in standards of utilization and measurement, such as minimum top diameter and log and boltwood scale, which can lead to confusion and erroneous conclusions on the part of the reader and,

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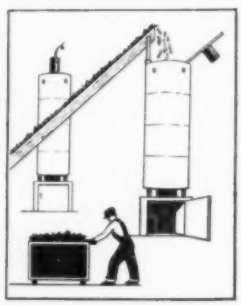

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Whereas studies concerning monetary values and yields pertaining to areas other than the reader's must be interpreted by the reader in standards of his own area to be useful to him,

Now therefore be it resolved that the New England Section of the Society of American Foresters recommend to the parent Society that a resolution be prepared and presented at the next national meeting encouraging authors and publishers of forestry literature, in which measurement and value figures are important, to show in the text or appropriate footnotes, the standards of measurement or value used and where appropriate, include also factors for conversion of the data to generally familiar standards.

Alaska Section Organized From Puget Sound Section

With the unanimous approval of the Council, the Alaska Section has been organized.

The Alaska Section thus becomes the 22nd official Section of the Society. It was formerly the Alaska Chapter of the Puget Sound Section. Alaska has 86 SAF members.

The officers of the new Section are:

Chairman, Carlos T. Brown, U. S. Forest Service, Juneau.

Vice chairman, Von Johnson, Anchorage.

Secretary-treasurer, Frank E. Lound, Ketchikan.

The first meeting of the newly organized Section will be held early in the autumn.

1963 SAF Meeting Dates and Headquarters City Listed

Boston, Mass. will be the city for the 1963 annual meeting of the Society of American Foresters. The dates are October 20, 21, 22, and 23. The Statler Hilton will be the headquarters hotel.

Selection of Boston for the meeting was in accordance with the action of the Council. Under the Society's rotation system the 1963 meeting is to be held in the northeastern region.

Annual meetings have now been scheduled as follows:

1959—San Francisco, Calif. November 15-18. Sheraton Palace Hotel.

1960—Washington, D. C. (Sixtieth anniversary meeting.) November 13-16. Sheraton Park Hotel.

1961—Minneapolis, Minn. (Joint meeting with the Canadian Institute of Forestry.) October 8-11. Leamington Hotel.

1962—Atlanta, Ga. October 21-24. Dinkler Plaza Hotel.

1963—Boston, Mass. October 20-23. Statler Hilton Hotel.

Southern California Section Has Space Age Forestry Program

Section Chairman Lynn Biddison presided at the spring meeting of the Southern California Section April 10 and 11 at the Lafayette Hotel in San Diego. Nearly 100 members and guests attended.

The theme of the technical session was "Forestry and Forest Products in the Space Age." George Craig, secretary-manager, Western Lumber Manufacturers, Inc., discussed forest industry's space age future; Society President George A. Garratt spoke of the future of forestry education; and Cali-

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fornia State Forester Francis Raymond talked on state forestry and the space age. A history of forestry in southern California was presented by William Mendenhall, Forest Service retiree. W. C. Branch, assistant regional forester, Region 5, USFS, summarized the findings of the Timber Resource Review.

At the evening banquet held in the Lafayette Hotel, Dr. J. W. Bon, Jr., chief physicist and head of anti-missile research at Convair, talked on recent findings in space research as the result of rocket and satellite flights.

The meeting theme was carried into the second day's program when members were conducted on a tour of the Mt. Palomar Observatory.

The following slate of officers was nominated and elected by unanimous ballot.

Chairman, Lynn Biddison.
Vice chairman, Lloyd Britton.
Secretary-treasurer, Robert Blanford.

Gulf States Section Holds 33rd Annual Meeting

With an attendance of 300 members, their ladies, and guests, the 33rd annual meeting of the Gulf States Section was held in Tyler, Tex. May 7 and 8, at the Carlton Hotel.

On the morning of the first day tours were taken to local forest products industries. The afternoon technical session had as its theme "Personal Development of Foresters." Alfred D. Folweiler, Texas Forest Service, served as moderator.

"What Industry Needs in a Forester" was discussed by Arthur W. Nelson, Jr., Champion Paper and Fibre Company.

"What Government Needs in a Forester" was explained by Lynne M. Correll of the U. S. Forest Service.

The development of foresters for teaching and research was treated by Clemens M. Kaufman, University of Florida School of Forestry.

A chuck wagon dinner, with entertainment and square dancing, was served at the Joe Zeppa Ranch. An archery exhibition was presented by the Tyler Field Archery Club.

The morning of the second day (Friday) was devoted to Section affairs. Chairman Arne Kemp presided.

An afternoon technical session on "Conflicting Land Uses" was held under the chairmanship of Phillip Wheeler.

Papers presented by SAF members were "Wildlife Considerations" by Howard A. Miller of the U. S. Forest Service and "Loss of Productive Timberland" by George W. Stanley, Kirby Lumber Corporation.

A social hour and reception preceded the Section's annual dinner. W. R. Beaumier, editor of the Lufkin *News*, was toastmaster. Fred Poole of the East Texas Chamber of Commerce gave the address of the evening.

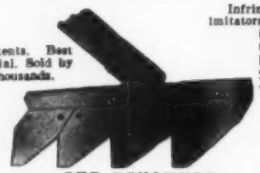
Following entertainment by the Apache Belles there was dancing in the ballroom.

New Section officers elected to serve for the year beginning July 1, 1959 were:

Chairman, Charles H. Lewis, of DeRidder, La., succeeding Arne Kemp.

Vice chairman, N. W. Sentell, of Hodge, La., succeeding Raymond Gipson.

Secretary-treasurer, A. B. Smith, of West Monroe, La., succeeding John Webb.



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Membership Applications and Advancements

Proposals for admission, advancement, and reinstatement received in the Society office during the month of May are listed below.

Action on the eligibility of those proposed for membership as listed below will be taken by the Council as of August 1959.

Communications from the voting members regarding the membership eligibility of these persons should be received in the Society office prior to that date.

Allegheny Section

Student Grade

PENNSYLVANIA STATE UNIVERSITY
Hopkins, H. R.

Junior Grade

Eallonardo, N. J., Sr. Eng., Wharton Tract Office, Egg Harbor City, N. J.; State Univ. of N. Y., BSF, 1956.
Hiligartner, G. G., Sr. Planner, Dept.

Cons. & Econ. Dev., Trenton, N. J., (Reinstatement).

Appalachian Section

Junior Grade

Earle, T. W., Forester, Canal Wood Corp., Greenwood, S. C.; N. C. State, BSF, 1958.

Gibbons, H. W., Forester, Canal Wood Corp., Dillon, S. C.; Mich. State, BSF, 1949.

Lambrecht, E. G., Forester, S. C. State Forestry Comm., Florence, S. C.; Mich. College of Mining & Tech., BSF, 1953.

Students Eligible for Automatic Advancement

NORTH CAROLINA STATE COLLEGE

Price, T. L. Utz, K. A.

Member Grade

Brown, P. A., Research Forester, W. Va. Pulp & Paper Co., New Bern, N. C.; Univ. of Fla., BSF, 1955 (Junior 1955).

Nicholson, J. C., Dist. Supt., W. Va. Pulp & Paper Co., Camden, S. C. (Junior 1951).

Affiliate Grade

Kleinhans, W. O., Unit Forester, International Paper Co., Conway, S. C.

Columbia River Section

Student Grade

OREGON STATE COLLEGE

Avery, S. H. Mann, K. D.
Crowl, J. D. McClelland, D.
Griggs, J. R. Slegelmilch, J. L.
Irwin, R. L. Souvenir, M. L.
LaBar, F. R. Thingvall, O. A. J.
MacWilliams, J. D. Weideman, G. A.
Wood, D. A.

Junior Grade

Hagen, G. W., Dist. Ranger, USFS, Maupin, Ore.; Ore. State, BSF, 1946.

Jessup, D. R., Forester, USFS, Detroit, Ore.; Univ. of Mich., BSF, 1958.

Philbrick, J. R., Forester, USFS, Portland, Ore.; Ore. State, BSF, 1934.

Spencer, H. G., Utilization Forester, Weyerhaeuser Tbr. Co., Eastside, Ore. (Reinstatement).

Affiliate Grade

Deffenbacher, F. W., Forester, USFS, Carson, Wash.

McCaleb, W. L., Dist. Game Agent, Ore. State Game Comm., Roseburg, Ore.

Gulf States Section

Student Grade

LOUISIANA STATE UNIVERSITY

Keaton, E. E. Thurman, M. B.

Junior Grade

Chaffin, J. W., Dist. Ranger, Kisatchie Natl. Forest, Leesville, La. (Affiliate 1955).

Hayden, T. C., Check Cruiser, International Paper Co., Nacogdoches, Tex. (Affiliate 1955).

Student Eligible for Automatic Advancement

LOUISIANA POLYTECHNIC INSTITUTE

Dowling, P. G.

Member Grade

Gardner, L. D., Circle Forester, St. Regis Paper Co., Gautier, Miss.; State Univ. of N. Y., BSF, 1940 (Junior 1955).

Obye, K. D., Tbr. Buyer, U. S. Gypsum Co., Greenville, Miss.; Iowa State, BSF, 1948 (Junior 1955).

Affiliate Grade

Briley, F. H., Forester, International Paper Co., Carthage, Tex.

Morgan, A. E., Forester, International Paper Co., Silsbee, Tex.

Inland Empire Section

Junior Grade

Fandry, D. D., Asst. Ranger, Priest Lake Dist., Nordman, Idaho; Univ. of Idaho, BSF, 1957.

Intermountain Section

Student Grade

UTAH STATE UNIVERSITY

Jensen, L. W.

Member Grade

Quinney, D. N., Asst. Prof., Utah State Univ., Logan, Utah; Mich. State, BSF, 1950; MS, 1954 (Junior 1953).

Kentucky-Tennessee Section

Junior Grade

Crook, J. D., Equipment Development Spec., Hiwassee Land Co., Calhoun, Tenn. (Reinstatement).

Karling, W. J., Asst. Chief Scaler, Hiwassee Land Co., Calhoun, Tenn. (Affiliate 1956).

Tillman, S. L., Service Forester, Ky. Div. of Forestry, Mayfield, Ky.; Univ. of Ga., BSF, 1958.

Member Grade

Larkey, B. J., Asst. Dist. Ranger, USFS, Erwin, Tenn.; N. C. State, BSF, 1955 (Junior 1955).

New England Section

Student Grade

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Kratz, R. N.

UNIVERSITY OF MASSACHUSETTS

Stiles, V. D.

Junior Grade

Larson, J. S., Executive Sec., Wildlife

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Member Grade

Reynolds, A. W., General Mgr., Batts of Eagle Lake, Inc., Eagle Lake, Me. (Junior 1952).

Robbins, W. C., Forester, Eastern Corp., Bangor, Me.; Univ. of Me.; BSF, 1954 (Junior 1954).

Associate Grade

Tufts, N., Pres., Tbr. Owners of N. E. Inc., Greenfield, Mass.

New York Section

Junior Grade

Bencze, F. J., Woodlands Supt., Oval Wood Dish Corp., Tupper Lake, N. Y.; N. Y. State, BSF, 1953.

Northern California Section

Member Grade

Johnstone, H. W., Logging Eng., Woodleaf Tbr. Corp., Woodleaf, Calif.; Univ. of Wash., BSF, 1955 (Junior 1955).

Affiliate Grade

Bertsch, E. H., Deputy State Forester, Calif. Div. of Forestry, Sacramento, Calif.

Associate Grade

Sinclair, A. T., Agriculturist, American Cynamid Co., Oakland, Calif.

Northern Rocky Mountain Section

Student Grade

MONTANA STATE UNIVERSITY

Lichlyter, B. R. McLaughlin, W. D.
Lovell, J. V. Schroedel, D. J.

Junior Grade

Parrish, J. B., Logging Eng., J. Neils Lumber Co., Rexford, Mont.; Mont. State, BSF, 1950.

Ozark Section

Member Grade

Westerberg, D. D., Dist. Ranger, USFS, Houston, Mo.; Univ. of Minn., BSF, 1952 (Junior 1952).

Puget Sound Section

Student Grade

UNIVERSITY OF WASHINGTON

Cook, T. H. Landis, G. W.

Junior Grade

Dess, J. H., Asst. Mgr., Weyerhaeuser Tbr. Co., Tacoma, Wash.; Univ. of Wash., BSF, 1947.

McCarthy, R. E., Forester, Scott Paper Co., Everett, Wash.; Univ. of Idaho, BSF, 1955.

Visminas, C. K., Proj. Forester, Simpson Olympic Tree Farm, Shelton, Wash.; Mont. State, BSF, 1958.

Member Grade

Begalka, W., Asst. Forester, Ketchikan Pulp Co., Ketchikan, Alaska; Colo. State, BSF, 1951 (Junior 1955).

DeZarn, D. D., Forester, Crown Zellerbach Corp., Neah Bay, Wash.; Univ. of Wash., BSF, 1954 (Junior 1954).

Philbrook, M. E., Forester, Ketchikan Pulp Co., Ketchikan, Alaska; Ore. State, BSF, 1955 (Junior 1955).

Pomeroy, R. M., Dist. Ranger, USFS, Darrington, Wash.; Univ. of Calif., BSF, 1949 (Junior 1955).

Stockton, R. D., Forester, Hoodsport Ranger Dist., Hoodsport, Wash.; Univ. of Mich., BSF, 1950 (Junior 1953).

Southeastern Section

Student Grade

ALABAMA POLYTECHNIC INSTITUTE

Davidson, J. R. Moran, R. H.
Tinsley, J. M.

UNIVERSITY OF GEORGIA

Benson, L. G.

Junior Grade

Nash, R. F., 505 Denson St., Fairfax, Ala.; API, BSF, 1956.

Sullivan, W. C., Dist. Supv., Bronson, Fla. (Reinstatement).

Summerour, C. W., Tbr. Estimator, U. S. Steel Corp., Birmingham, Ala.; API, BSF, 1955.

Swift, C. S., Self-employed, Monroeville, Ala. (Reinstatement).

Upper Mississippi Valley Section

Student Grade

IOWA STATE COLLEGE

Brisbin, R. L. Johnson, R. W.
Ferguson, N. B. Renken, D. P.
Jensen, K. F. Starke, R. K.

Associate Grade

Arneman, H. F., Assoc. Prof., Dept. of Soils, Univ. of Minn., St. Paul, Minn.

Wisconsin-Michigan Section

Student Grade

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MICHIGAN STATE UNIVERSITY

MacGregor, J. R. Smith, R. W.
Snowden, W. C.

UNIVERSITY OF MICHIGAN

Martin, R. P. Swanson, D. O.

Junior Grade

Benson, J. L., Forester, Consolidated Water Power & Paper Co., Rhinelander, Wis.; Wis. State, BS, 1951; Univ. of Minn., MF, 1958.

Semmens, G. N., 926 Chicago Ave., Waukesha, Wis. (Reinstatement).

Tubbs, D. P., Asst. Dist. Forester, Wis. Cons. Dept., Waupaca, Wis.; Mich. College of Mining & Tech., BSF, 1955.

Affiliate Grade

Brown, N. J., Land Use Specialist, Dept. of Cons., Houghton Heights, Mich.

Peryam, N. J., Asst. Forester, American Can Co., Amasa, Mich.

Reynolds, M. K., Owner & operator of personal tbr. lands, Marquette, Mich.

Tardiff, R. R., Forestry Aid, USFS, St. Ignace, Mich.

Wickman, S. R., Area Forester, American Can Co., Amasa, Mich.

No Section

Member Grade

Duggan, W. E., Co. Forester, Marshall Lbr. Co., Marion, N. C. (Reinstatement).

Corresponding Grade

Hsu, Chi-You, Jr. Forester, Agric. & Forestry Aerial Survey Team, Taipei, Taiwan, Free China.

Forestry News

Honored For Outstanding Achievements

One hundred and forty-four employees of the U. S. Department of Agriculture were honored on May 26 for outstanding achievements by special ceremonies held on the Washington Monument Grounds in Washington, D. C. Among those honored were 14 Forest Service employees.

One of seven Distinguished Service Awards was made to Leonard I. Barrett, staff assistant in the Forest Service Division of Program Planning and Special Projects, "For outstanding contribution to the Timber Resource Review inspiring leadership in forest management research, and a continuous high standard of performance during a dedicated career." In 1952 Mr. Barrett was called upon to plan and conduct a nationwide survey and appraisal of timber resources. This survey was published in 1958 under the title of *Timber Resources for America's Future*. From 1945 to 1952 he was chief of the division of forest management research, before that director of the Central States Forest Experiment Station, and on the staff of both the Southern and Southeastern stations. He has been employed by the Forest Service for 35 years.

Superior Service Awards were given to 13 other members of the Forest Service as follows: Linne Ahlberg, Washington, D. C.; Robert Aufderheide (posthumously); Cecil E. Clapp, Atlanta, Ga.; Clayton S. Crocker, Missoula, Mont.; Clarence A. Dyson, Lemmon, S. Dak.; Lewis R. Grosenbaugh, New Orleans, La.; Noble H. Harpp, Lake George, N. Y.; Jasper E. King, Washington, D. C.; Elliott T. Merrick, Asheville, N. C.; Bessie L. Oats, Missoula, Mont.; Harry L. Rossoll, Atlanta, Ga.; Theodore S. Seely, Pisgah Forest, N. C.; Fleming K. Stewart, Missoula, Mont.; Jack Arnold Tice, Sierra Madre, Calif.; and J. Wesley White, Duluth, Minn.

In addition, Unit Awards, to be made at unit headquarters at a later date, were given to the Crossett Research Center, Crossett, Ark., and to the Smoke-jumper Unit, Gila National Forest, N. Mex.

Southern Forestry Conference Spotlights Research Needs

Research as it relates to the business of forest farming came under the spotlight of critical appraisal April 23 and 24, when timber growers and processors from 15 southern states gathered at Tuscaloosa, Ala., for the 18th Southern Forestry Conference, called by the Forest Farmers Association, Atlanta, Ga.

Keynoted by Reuben B. Robertson, Jr., Hamilton, Ohio, president of the Champion Paper and Fibre Co., who reviewed research's "areas of challenge," the conference also took up the growing problem of forest taxation.

Kenneth S. Kirkwood, who combines cattle raising with timber production on a 900-acre farm near Auburn, Ala., outlined to the conference the basic research needs of the small forest farmer.

Research's role in the South's forest pest situation was outlined by James A. Beal, director of Forest Insect Research, U. S. Forest Service, and John P. Hansbrough, director of the Service's Division of Forest Disease Research.

Results of tree improvement studies were presented by Dr. Bruce J. Zobel, of the School of Forestry, North Carolina State College, at Raleigh.

William E. Sanders, Washington, D. C., staff counsel for the Forest Industries Committee on Timber Valuation and Taxation, reviewed recent developments in forest taxation.

Leading discussion in other phases of research were Dr. V. L. Harper, Washington, D. C., assistant chief, U. S. Forest Service; Richard Kilbourne, Norris, Tenn., director, Division of Forestry Relations, TVA; Charles H. Driver, Bainbridge, Ga., director of forest research at International Paper Company's Southlands Experiment Forest; and John T. Cas-

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Forest Practices Developments in the United States 1940-1955. The report, in three parts includes (1) highlights of major developments affecting forest practices during 1940-1955; (2) digest and summary of present state legislation on cutting practices; and (3) annotated bibliography with a key to 1940-1955 literature. **Price $1.**

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sady, Marianna, Fla., in charge of the East Gulfcoast Research Center, Southern Forest Experiment Station.

With Dr. George A. Garratt, dean of the Yale Forest School, serving as toastmaster, a testimonial luncheon to Walter J. Damtoft, the South's first industrial forester, drew more than 300 friends and delegates. Mr. Damtoft, who retired in 1958 as assistant secretary and director of general woods department for Champion Paper and Fibre Co., began his career with Champion in 1920.

Alabama's Lieutenant Governor Albert Boutwell was the featured speaker at the annual Forest Farmer Banquet. Senator John Stennis of Mississippi was named to receive the 1959 Forest Farmer Award.

F. Fraser Darling to Head Foundation Research

Appointment of Dr. Frank Fraser Darling, British ecologist, as vice president for research of the Conservation Foundation has been announced by its president, Fairfield Osborn. Formerly senior lecturer in ecology and conservation at the University of Edinburgh, and for many years a member of the Scientific Advisory Council of the foundation, Dr. Darling is a Fellow of the Royal Society of Edinburgh, and holds the degrees of Doctor of Science and Doctor of Philosophy.

Dr. Darling is well known to ecologists throughout the world for his research studies in biology, agriculture, natural history, animal husbandry, wildlife, and genetics.

He will guide the continuing research work of the foundation, which currently includes studies of population pressures, crop yields, water usage, Alaskan development, and the effects of chemical pesticides on the environment.

USDA Reports Drop in Amount of Wood Treated With Preservatives

Commercial wood preserving plants reported the volume of wood treated in 1958 was the lowest in 20 years, according to preliminary statistics compiled by the U. S. Department of Agriculture and the American Wood Preservers' Association.

Some 217 million cubic feet of wood products were treated with preservatives during 1958, compared with 274.5 million cubic feet finally reported in 1957.

The greatest decrease showed up in the use of preservatives on cross-ties. About 21,326,000 cross-ties were treated in 1958, compared to 31,505,500 in 1957. The number of poles treated dropped from 6 million in 1957 to 5 million in 1958.

The only wood product which showed an increase in preservative treatment was fence posts, with 21,854,400 treated in 1958 compared to 20,827,600 in 1957. Less lumber, timbers, piling, switch ties, crossarms, and woodblocks were treated. The preliminary summary is based on reports from 328 of the 368 wood treating plants in the country. It is estimated that the information is 95 percent complete for the wood preserving industry.

Appointed to FAO Post

Dr. Frank W. Parker of the United States was appointed assistant director-general for the Technical Department, FAO, which comprises the former Agriculture Division and will, in a year's time, include the Fisheries, Forestry and Nutrition Divisions. Dr. Parker was, until his appointment, chief agriculturalist of the U.S. Technical Co-operation Mission to India.

Private & Industrial

Industrial Forestry Association Marks 25th Anniversary

H. O. Puhn, Simpson Logging Co., Shelton, Wash., was reelected president of the Board of Directors, Industrial Forestry Association, at its recent meeting in Portland, Ore.

New officers elected were N. B. Giustina, Giustina Bros. Lumber Co., Eugene, Ore., vice president; R. P. Conklin, Cascades Plywood Corp., Portland, Ore., secretary; and Werner Mayr, Mayr Bros. Logging Co., Inc., Hoquiam, Wash., treasurer.

W. D. Hagenstein and N. E. Bjorklund, both of Portland, were reelected executive vice president and assistant secretary, respectively.

Three new directors elected were Marshall Leeper, United States Plywood Corp., Eugene, Ore.; F. J. Sandoz, The Booth-Kelly Lumber Co., Springfield, Ore.; and T. R. Sheldon, Scott Paper Co., Everett, Wash.

The association's other 16 directors and 3 honorary directors were all reelected.

The meeting marked the 25th anniversary of the establishment of the Industrial Forestry Association. In his annual report Hagenstein out-

lined progress made in forestry in the Douglas-fir region since 1934, the growth of forest industry, and the accomplishments of the association.

Continental Can Company Names T. W. Earle A Vice President

T. W. Earle of Savannah, Ga., general manager of the Woodlands Division of Continental Can Company, has been elected a vice president of the company, Thomas C. Fogarty, president, has announced.

Continental and its subsidiary Southern Paperboard Corporation own or hold on long term leases more than 1,115,000 acres of woodlands in seven southern states to meet in part the pulpwood requirements of three kraft mills and a bleached sulphate paperboard mill which is now under construction.

A native of Sacketts Harbor, N. Y., Mr. Earle was graduated in 1922 from Syracuse University with a degree in forestry. In 1923, he joined the St. Lawrence Corporation in Canada as woodlands manager, and later served also as assistant to the president. He joined the North Carolina Pulp Company in 1937 as general manager of woodlands.

T. W. EARLE

In 1945, when Southern Paperboard Corporation formed the subsidiary Gair Woodlands Corporation to acquire and manage timberlands, Mr. Earle became president of Gair Woodlands. Southern Paperboard became a subsidiary of Continental Can in 1956 and Mr. Earle was named to head woodland operations in Continental's Containerboard and Kraft Paper Division. He became general manager of the Woodlands Division when it was established in January of this year.

Council Discusses Animal Damage

Damage caused annually to the forests of the Pacific Northwest by wild animals has been estimated to cost $12 million or more, according to Royce O. Cornelius, managing forester of Weyerhaeuser Timber Co., speaking at a two day special session of the Northwest Forest Pest Action Council.

Visitors at the session of the council included representatives of the U.S. Fish and Wildlife Service, which is being encouraged to establish an animal damage research center in the State of Washington.

Cecil S. Williams of the Denver, Colo., research laboratory noted that "Anyone observing the pressures being exerted by wild animals on forest regeneration cannot help but be concerned about this problem not only in relation to the forests themselves but also to the public recreation the forests are expected to sustain in the future."

William Looney, chairman of the

FOUR IMPORTANT McGRAW-HILL BOOKS

CONSERVING NATURAL RESOURCES, Principles and Practice in a Democracy, Second Edition. By Shirley W. Allen, Professor Emeritus, Department of Forestry, School of Natural Resources, University of Michigan. 370 pages, $6.75

RECREATIONAL USE OF WILD LANDS By C. Frank Brockman, Professor of Forestry, College of Forestry, University of Washington. *McGraw-Hill American Forestry Series.* 346 pages, $8.50.

FOREST FIRE: CONTROL AND USE by Kenneth P. Davis, Professor of Forest Management, and Chairman of the Department of Forestry, School of Natural Resources, University of Michigan. *McGraw-Hill American Forestry Series.* 584 pages, $12.00

NATURAL RESOURCES by M. R. Huberty, Department of Engineering, University of California, Los Angeles; and W. L. Flock, Associate Engineer and Lecturer, Department of Engineering, University of California, Los Angeles. *McGraw-Hill UCLA Extension Series.* 556 pages, $11:00.

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council's wildlife committee, outlined the basic types of animal damage caused by rodents and small game, elk and deer, bears, and porcupines. "Recognition of the importance of these problems to all forest owners," he said, "has resulted in organization of cooperative groups to spearhead research to reduce this tremendous loss to our forests."

Lumber Association Announces Change in Government Specifications, Education Heads

Anthony M. Camarano, former Washington, D. C., representative of the Southern Pine Association, has been named manager of the Government Specifications Department of the National Lumber Manufacturers Association, Washington, D. C., Gerald F. Prange, director of NLMA's Technical Services Division, has announced.

Camarano, a Michigan State University graduate in wood technology, will seek the continued and expanded specification of lumber over competing materials. He will also encourage the development of specifications covering new uses and applications of lumber and wood products.

John Zerbe, formerly responsible for these assignments, has been appointed assistant to the director of NLMA's Technical Services Division. Among other duties, Zerbe will manage the association's educational activities. This will include the distribution of material designed to encourage top high school graduates to seek careers in the forest products industries and the dissemination of technical data on wood to architectural and engineering schools.

Industry Forester to New Post

Robert C. Lindsay, Crown Zellerbach Corp. protection forester, Portland, Ore. office, has been named contract logging supervisor for the Netarts tract of the company's Tillamook Tree Farm. He will be in charge of all contract cutting on the Netarts block including pre-logging and salvage operations.

Lindsay is a graduate of Oregon State College's School of Forestry and served for 11 years as resident forester at Crown Zellerbach's Columbia Tree Farm (now the Edward P. Stamm Tree Farm) near Vernonia.

For the past two years, he has been attached to the company's Portland office as protection forester in charge of all fire protection and reforestation activities on Crown Zellerbach's 12 Northwest tree farms.

Crown Zellerbach Forester Promoted

L. N. Rees, logging manager for Crown Zellerbach's Cathlamet and Clackamas divisions has announced the appointment of Merle A. Mosar as superintendent of the Clackamas division with headquarters at Molalla, Ore.

Mosar, a 1951 forestry graduate of Oregon State College, was previously assistant superintendent of the company's Cathlamet division at Cathlamet, Wash. in Wahkiakum county. He succeeds G. W. Nutter, who was recently named superintendent of Crown Zellerbach's Neah Bay division in Northwest Washington.

Industry Assists Students

St. Regis Paper Company has announced that its Northwest Undergraduate Forestry Scholarship for 1959-1960 has been awarded to Lawrence E. Goodman, a sophomore at the School of Forestry, Oregon State College. The scholarship, valued at $1,600, extends over two years.

In North Carolina Harold C. Blanchard has received a $4,000 scholarship from Continental Can Company for four years of study in the field of forestry. A similar award in Louisiana was given to Kenneth Ray Johnson.

Gair Woodlands Corporation has announced four-year scholarships of $1,000 per year awarded to Franklin Hitchcock in Georgia, who will attend the University of Georgia School of Forestry, and James Terrill, Florida, who will attend the University of Florida.

Pulp and Paper Day Launches Pilot Projects

The Southern Pulpwood Conservation Association's 92 Pilot Forest projects in 12 southern states were "successfully launched" on the second annual Pulp and Paper Day, April 14, at dedication ceremonies attended by approximately 15,000 people.

Henry J. Malsberger, of Atlanta, Ga., general manager of the SPCA, in a round-up report, said that the 27 member companies of the association "are highly pleased at the success of the initial phases of this extensive industry-sponsored forest development program for small woodlands."

Purpose of the Pilot Forests, established by SPCA-member pulp and paper companies located throughout the South working in cooperation with private landowners of small woodland tracts, is to provide permanent educational examples of proper forestry practices.

Mosebrook Joins Weyerhaeuser Sales Co.

Harry N. Mosebrook has been named manager of public relations for Weyerhaeuser Sales Co., St. Paul, Minn. He goes to this position from that of forester with the American Pulpwood Association, New York. Previously he was with the Natural Resources Department of the U. S. Chamber of Commerce in Washington, D. C.

Forest Industries Welcome Recreationists

The American Forest Products Industries reports that forest industries in all parts of the nation are welcoming recreationists this spring and summer.

"Our information indicates that more than 90 percent of the commercial timberlands owned by forest industries is now open to the public for recreation," said James C. McClellan, chief forester for AFPI.

McClellan said reports from several hundred companies showed lands open to fishing and hunting in season, also year-around sports such as hiking, picnicking, skiing, and camping. Some of the companies operate public parks. Others provide improved picnic and camping areas, while many take special steps to aid and encourage recreational uses.

Schools

New Professorship Established At Yale

A grant of $300,000 to the Yale University School of Forestry from the General Service Foundation to establish a new C. R. Musser Professorship of Industrial Forestry has been announced by President A. Whitney Griswold of Yale.

The new professorship, first of its kind in this country, is named in memory of C. R. Musser of Muscatine,

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Iowa, one of the industry advocates of modern forestry practices in the field of American forest products.

Mr. Musser was associated throughout his entire business career with some of the leading timber and forest products companies of the country. He served from 1919 to 1950 on the Board of the Weyerhaeuser Timber Company, of which his father was one of the original incorporators and first directors. He also served as a director of The Northwest Paper Company of Cloquet, Minn., Potlatch Forests, Inc., of Lewiston, Idaho, and Boise Payette Lumber Company of Boise, Idaho.

First incumbent of the new C. R. Musser chair will be Zebulon W. White, who joined the Yale School of Forestry faculty in 1958.

George A. Garratt, dean of the School of Forestry, stated: "The endowment of this chair represents a major development in strengthening and balancing the School's program of graduate education, as it relates to both private and public forestry."

The new professorship will also give support to the program of short-term seminars for industry representatives which the School of Forestry has sponsored since 1955. These two-week sessions are held periodically for the benefit of company executives, forestry administrators, and other management representatives concerned with industrial forestry operations. A total of eight such seminars have been held to date, including two each at Crossett, Ark. and Berkeley, Calif., the latter under the joint sponsorship of the Yale and University of California Schools of Forestry.

Southern Schools Hold Second Annual Conclave

The Second Annual Conclave of Southern Forestry Schools, a southwide field day initiated by the University of Georgia School of Forestry, was held at Camp Grant Walker near Pollock, La., May 2. The conclave included contests based on outdoor sports, woodsmanship, and technical levels. More than 200 persons attended from ten southern forestry schools and from Louisiana industries.

Prizes, donated by various manufacturers throughout the United States, were awarded the individual winners of each contest and the winning school. The conclave was financed by cash donations from 24 Louisiana forest industries.

The first place school, University of Georgia School of Forestry, also last year's winner, was awarded a gasoline powered chain saw with carrying case and a tree injector. Tying for second place were Louisiana State and Florida Schools of Forestry.

The Third Conclave will be sponsored by the Alabama Polytechnic Institute in Auburn.

Duke University Sponsors Direct Seeding Discussions

About 250 foresters and land managers attended Duke University's Direct Seeding Symposium April 21 and 22 at the Durham, N. C., campus.

Discussions during the two-day program were divided into five sessions and covered direct seeding in perspective, seed production and preparation, factors related to direct seeding success, requirements for direct seeding, and evaluation of the results. Participants in the program represented government service, industry, and education.

Serving on the program committee were F. W. Woods and L. E. Chaiken of Duke University and J. T. Cassady, Southern Forest Experiment Station, Marianna, Fla.

Plans are underway to publish a proceedings of the symposium. Copies should be available within a few months from the Duke School of Forestry.

Woodsman's Training Course at University of Minnesota

A woodsman's training course was established in September 1958 as a joint venture of the North Central School of Agriculture at Grand Rapids, Minn. and the School of Forestry, University of Minnesota. The woodsman's training course has as its objective the training of men who wish to improve their skills and knowledge in the fields of forestry on a noncollegiate or subprofessional level. It is expected that graduates will be

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qualified as forestry assistants; for entering employment leading to a number of forestry positions such as cruisers, scalers, inspectors, clerks; and for greater proficiency in self-employment in the logging industry.

The curriculum consists largely of practical subjects, taught mainly in the field. Classroom study will be provided to instruct the students in necessary theory and business techniques.

This course is open to a limited number of young men of good character who are at least 18 years of age. The prospective woodsman trainee must have a high school education or equivalent or have considerable woods experience in lieu of formal education.

Applicants may be required to pass a preliminary examination on their previous school training, physical capacity, and knowledge of woods work before being admitted to the school. All applicants who are accepted must undergo a trial period of one month during which time they are judged as to whether or not they are capable of adapting themselves to conditions which forest employment will ultimately require of them. Students who do not successfully complete the trial period will not be continued in school.

All subjects in the woodsman program are compulsory. Regular attendance at all classes and field periods is required.

Inquiries should be sent to the Principal, North Central School of Agriculture, Grand Rapids, Minn.

Public

National Forest Recreation To Be Studied

A detailed review of outdoor recreation in the national forests will begin July 1. Called the National Forest Recreation Resources Review, its purpose is to get a complete and factual inventory of recreation resource potential of the national forests. Facts thus gained will be the basis of programs for the activation of all recreation resource management activities on the national forest system.

The review is also expected to supply information needed by the National Outdoor Recreation Resources Review Commission which was established by law in 1958.

In 1924 about 4 million recreation visits were made to national forests; by 1957 that figure had jumped to 61 million annual visits; in 1958 it went to 68½ million, an upsurge of 12 percent over the previous year. All indications are that this trend will continue.

Project leaders will work out of 10 regional offices, with the ranger district as the basic unit to be examined. Final data will be compiled for regions and states.

The first phase of the review will involve finding out what lands are suitable for various recreational uses. Field crews will then go in and inventory these areas to determine the acreage available, how accessible it is to the public, whether water is available, what natural attractions are nearby, and over-all quality of the area from the standpoint of public recreation. All kinds of outdoor recreation will be considered.

Field work is scheduled to be completed in the fall of 1960. Data from the field, along with other information, will be compared with estimated future recreation use. The final report will be issued in the spring of 1961. From these studies will come firm plans to best use the resources of the national forests to meet outdoor recreation needs of a much larger population in the future.

Klamath Land Sales Offered

The first sales of Klamath Indian Reservation lands in Oregon have been advertised for bids by the Interior Department's Bureau of Indian Affairs. Sealed bids will be received by the bureau at its office in Klamath Falls until January 20, 1960. The area involved in the first sales totals 257,436 acres.

A preliminary requirement is that the bidder must submit in triplicate to the U. S. Forest Service, Portland, Ore., his plan for sustained-yield management of the lands.

Altogether, the Interior Department will offer 617,000 acres of Klamath land during a 16 month period. Bidders must agree to sustained-yield management requirements and other terms set forth by the Forest Service and the Interior Department. Land units not sold by April 1, 1961, will be purchased by the federal government and added to the national forest system.

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C. A. Bennett Retires

Retirement June 30 of Chester A. Bennett, forest supervisor of the Okanogan National Forest, has been announced by Regional Forester J. Herbert Stone of the Pacific Northwest Region.

Bennett is a native of Oregon and a graduate of Oregon State College in 1930. He entered the U. S. Forest Service in 1925 as a seasonal employee and in 1931 received probational appointment as a forester. He has been a forest supervisor since 1944 and has been in that position on the Okanogan since 1954.

Bennett is a veteran of over 30 years of service with the Forest Service. All of his career has been spent in the Pacific Northwest Region.

N. W. Utilization Research Chief Named

John B. Grantham, director of the Oregon Forest Products Research Center, has been named chief of the forest utilization research division at the Pacific Northwest Forest and Range Experiment Station in Portland, Ore.

His appointment, effective July 1, was announced by R. W. Cowlin, director.

Grantham has been director of the Oregon Forest Products Research Center since 1953 and was associated with the center for nine years before that. From 1944 to 1951, he was head of the Forest Products Department of Oregon State College's School of Forestry. During this time he was employed part time at the center, joining the staff full time in 1952.

Grantham has degrees in forest products from the University of Washington and New York State College of Forestry at Syracuse.

Interior Reports on 1958 Timber Utilization

Timber harvested during the calendar year 1958 from lands administered by the Department of Interior amounted to 1,731,141 M bd. ft., the highest cut recorded in the history of the department's forestry operations. This was 363,201 M bd. ft. greater than the cut in calendar year 1957. The harvest was substantially greater on both the lands of the Bureau of Indian Affairs and the Bureau of Land Management.

The average value per M bd. ft. was $21.78 as contrasted to $22.02 for the previous year, a decrease of 24 cents. Actually the timber market posted lower prices during the first half of the year with stumpage values showing a considerable improvement toward the end of the year.

In 1948 there was harvested from the lands managed by the department 1,247,683 M bd. ft. valued at $6,861,057 or an average value per M bd. ft. of $5.49.

TVA Promotions Announced

Earl F. Olson has been appointed assistant chief of the Forest Development Branch, TVA Division of Forestry Relations. A member of the TVA forestry staff for almost 25 years, he has a B. S. degree in forestry from Iowa State College and an M.F. degree from Duke University.

William H. Ogden has been named head of TVA's Forest Economics Section. A graduate of North Carolina State College Forestry School, he joined TVA in 1939 and succeeds W. W. Jolly who died recently.

Forestry Employment

S.A.F. members are privileged to insert one 60-word advertisement in this column without charge. Forest industries desiring to employ foresters may insert advertisements at the rate of $4 per column inch. Copy must be received by the end of this month for an advertisement to appear in the issue after next.

Obviously the Society cannot assume responsibility beyond making it possible for prospective employee and employer to enter into negotiations.

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Position open for forest economist in teaching and research. Ph.D. or equivalent required. Starting rank and salary depend on experience and training of applicant. Teaching responsibilities include 6-7 semester hours (about half time) in utilization, management, and economics. Facilities, working conditions, salary, and professional opportunities are considered favorable.

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Box X, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester, B.S.F., 1950, Univ. of Georgia; M.F., 1951, Duke. Age 33, married, 2 children. Seven years with paper company in the Southeast; experienced in all phases of southern forest management; wood procurement; land acquisition by lease and in fee simple; and public relations activities. One years' experience in sales management. Interested in responsible position with expanding company.

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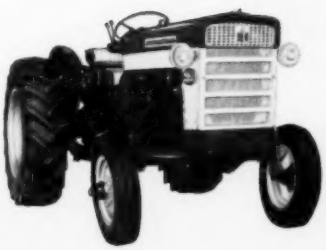

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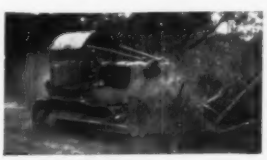

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